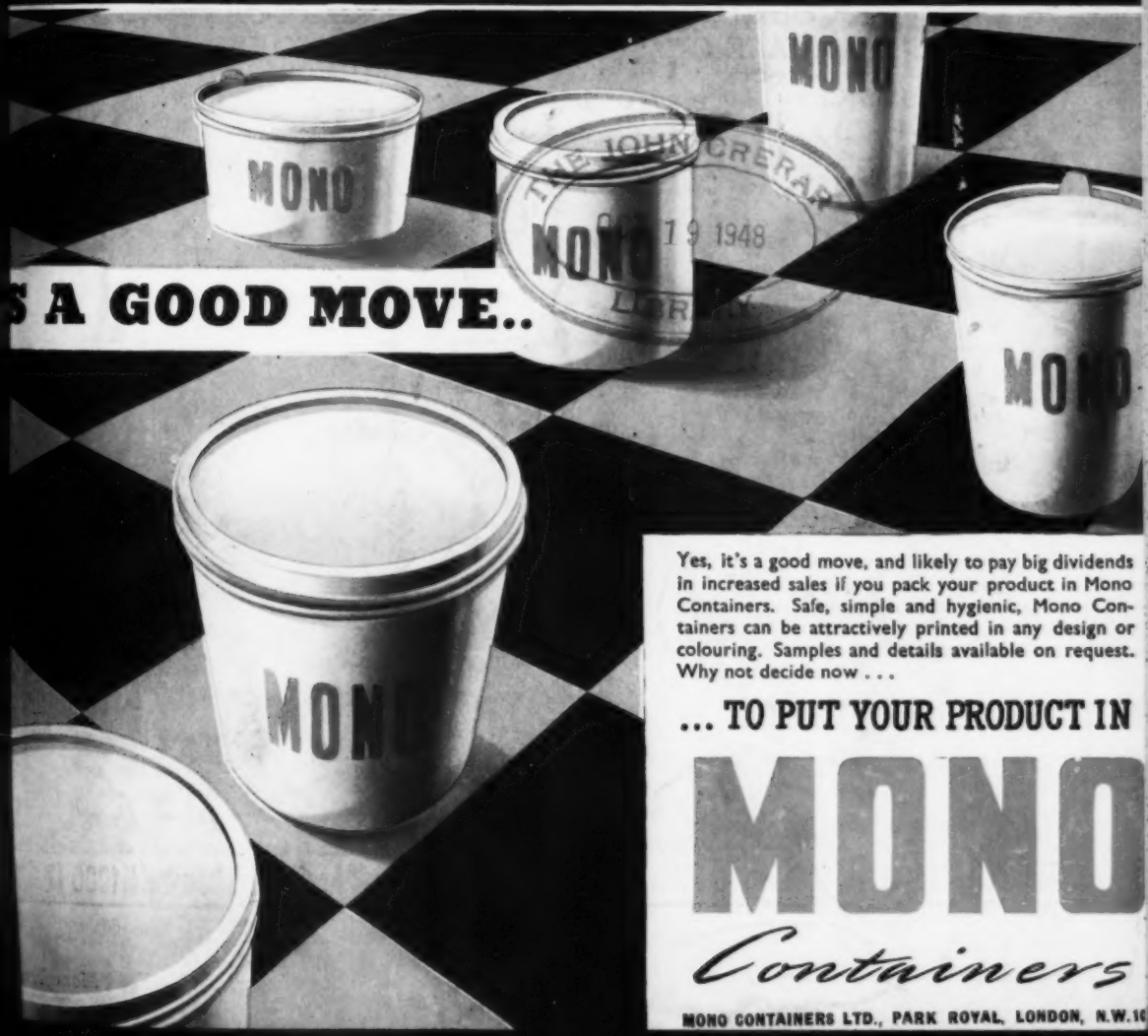

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October, 1948—*Food Manufactu*

FOOD MANUFACTURE

Vol. XXIII, No. 10 October 1, 1948

Public Accounts Criticism

THE Committee of Public Accounts, in its second report of the examination of expenditure, voices considerable criticism of the Ministries, among which figure four references to the Ministry of Food. The first records that the Ministry does not distinguish in its trading accounts between subsidy and trading losses. A distinction is made in the accounts of other Ministries. This is not practicable, so says the Ministry of Food, in its own case. The Committee allows the matter to rest there and reflects that, as the accounts are audited by the Comptroller and Auditor-General, "he will be able to draw attention to any transactions which call for special comment." The Committee is also content to let some subsidies be termed "social services," as, for example, the supply of milk under various schemes.

It is recommended that there be wider use of Government-owned cold stores: the recommendation is influenced by the knowledge that these lost money during 1946-47, whereas privately-owned ones made a handsome profit. Whale oil transactions by the Ministry of Food are noted, especially that large purchases were made in 1946-47 at £100 per ton against £56 per ton in 1945-46. The Ministry holds that the heavier outgoing was justifiable "in the light of world prices." This defence fails to impress the Committee, which remarks that the whaling ships should have been requisitioned.

All the political parties are represented on the Committee, but, as it largely ruminates on happenings after the event, its deliberations, even at their most outspoken, can scarcely have a salutary effect. The financial purist would not agree that the Ministry of Food should be allowed to postpone disclosure of trading losses; but, admittedly, no one knows nowadays where general policy ends and strict finance begins. The designation of some subsidies as "social services" is open to objection, providing as it does a convenient resort for governments busy in out-running the constable. However, employment of this particular euphemism has not gone far as yet. It is right that the best—or most efficient—use should be made of Government cold stores; but there should be no placing of privately-owned stores at a disadvantage because of the latter's success.

The Ministry's plea that £100 per ton for whale oil was reasonable is not tenable, and the Committee does well to reject it outright. A bad bargain was made, but it has also to be recognised that the only alternative, namely the requisitioning of the whaling ships, would have aroused sharp controversy.

Great and Small Beasts

Once more the propaganda specialists of the Ministry of Food are getting ready for the launching of another campaign—a second attempt to popularise whalemeat. This, we are told, is to be a new and remarkable whalemeat, "not up to sirloin standard, but certainly as good and tasty as ordinary beefsteak."

Much effort has been spent on investigations over the past three years, mainly concerned with the problem of the oiliness and fishy flavour, and a panel of experts has set out certain conditions which must be fulfilled if meat of only prime quality is to be offered for sale. Research has also been carried out at Cambridge, where officers of the Scientific Research Department of the Ministry have been experimenting with whalemeat in a variety of ways, testing it for bacteria and nutritional qualities, and submitting it to different freezing processes. Teams have even gone to the Antarctic with the whalers to get their data first hand.

It is rather surprising that whalemeat has not caught on with the majority of the British public, whose persistent cry is not only for more food, but for something different. Perhaps it is because hitherto the steaks in their raw state do not present a very appetising picture on the slabs of butchers' and fishmongers' shops, and it may be that the new whalemeat will banish the consumer's prejudice on its second appearance.

At the other end of the size scale is another product which apparently offers possibilities in the direction of new food—plankton. Dr. Cecil von Bonde, the South African zoologist, is starting a

campaign on his own account in an attempt to ease world food shortages. The animal form—zooplankton—is like a tiny shrimp, and, says Dr. von Bonde, besides being equal in nutrition to the best meat, is tasty in soups and sandwiches.

Bakers' Broadcast

The recent broadcast in the series "Meet the People," in which Fred Watcham, sixty-year-old baker, was featured with his wife, his son Frank, and Ted Cooper, another well-known veteran baker, has evoked some protests to the B.B.C. in the name of the trade. The bone of contention was the adverse references to night baking expressed in the broadcast.

We are not concerned here with this highly controversial subject, but were interested in some comments in a recent issue of the *Bakers' Record* regarding the preparation of the programme. It did not follow the lines which would have been chosen had the bakery industry been invited officially to provide the material; however, those responsible for building up the broadcast were not concerned in providing propaganda for the industry, but in giving what they regarded as arresting broadcast matter to capture the interest of the listening public. The writer points out that those complainants who are so anxious to speak in the name of the trade should have approached the B.B.C. when the feature was first under consideration. At that juncture collaboration would probably have been welcomed, particularly if it could have been shown that other potentially good broadcasting personalities were available.

We cannot help thinking that this would be the wisest way to tackle this sort of broadcast. The trade associations would help to provide a balanced picture of their trades and also act as a filter through which thoughtless propaganda would not escape—propaganda which might elude the B.B.C.'s editorial eye—without affecting the seeming spontaneity of the broadcast.

Death Lurks in the Meadows

"I can tell the difference between good and bad mushrooms" may sometimes, if comparatively rarely, be included among famous last words. At this time, when mushrooms are springing out of the ground like bubbles on soapy water, the *B.M.J.*, in a recent issue, devotes three pages to mushroom poisoning.

The tale of the Death Cap is a gruesome one. The eater of *Amanita phalloides* in most cases (in the terse modern idiom) "has had it," and the manner of his departure to the Elysian fields is not pleasant.

Although a commonplace occurrence on the European continent, few cases of mushroom poisoning have been reported in the literature. Two authorities in 1946, recording four fatal cases, could trace only twenty-one cases with fourteen deaths in Great Britain between 1930 and 1942. Birch (1946), quoting from the Registrar-General's record, could find only thirty-eight cases of fatal fungus poisoning in England and Wales between 1920 and 1945. These figures are reassuring, but, as the writer in the *B.M.J.* points out, there are many continentals still in our midst, and warning may be useful.

Some interesting sidelights on treatment are given. Working from the fact that rabbits do not die after eating the Death Cap, although the juice of the fungus is fatal if injected into them, it occurred to one investigator that the rabbit's stomach could destroy the toxin. Nine patients were treated with five uncooked minced rabbits' brains and stomachs. However, eight out of the nine died. Apparently this cure may be dismissed.

Mushrooms are, in the words of Private Paget, "very succulent herbage," and the odds are such (compared with the chances of death on the road) that it is probable that the most timorous will accept them.

Food and the Atomic Age

The food and agricultural industries will be profoundly influenced by the peaceful development of nuclear fission. Indeed, it is no exaggeration to say that we stand on the threshold of a new era in fundamental nutritional research. With the second atomic pile, BEPO, now in operation at Harwell, supplies of radio-isotopes for many kinds of investigations will no longer be mainly based upon United States production. The movements of specific elements in many fundamental biological or biochemical changes can be followed as definitely as if they carried coloured labels; never before has it been so certain that we can untangle the complexities of Nature's synthetic chemistry.

More food, better understanding of diseases

and of positive nutrition—these are the most likely developments of radio-isotope research. We cannot flatter ourselves that we have planned this degree of selection; the world is not organised with such a notable appreciation of human values. But it will nevertheless happen that way because we are afraid of widespread application of the new research method to more material problems.

The stream of results is already beginning to flow in America and Canada, but it would be as well not to arrive at hasty conclusions until quite a number of independent tests by different teams of workers have confirmed any new piece of knowledge.

It is now possible to follow the path of a nutritional element like calcium or phosphorus or cobalt from its first addition to the soil as fertiliser through to its successive performances in pasture or fodder, in animal fats or bones or proteins, in meat or milk, or manures that return to the soil, and even in the metabolism of humans who consume the animal products. But one query must be borne in mind. Does the radio-activity *per se* influence any of the assimilations? It is reported from Russian research that radio-isotopes have caused remarkable increases in plant-growth; Western research workers cannot accept this as a critical result. It is, however, of vital importance. We dare not *assume* that radio-isotopes behave biochemically exactly as their non-radio-active fellow-atoms would behave in Nature. We must be certain about it, or we run the risk of basing a new era in research on a fallacy.

Keeping Properties of Dried Bakers' Yeasts

From investigations made by Julian Oyaas, Marvin J. Johnson, W. H. Peterson, and Roy Irvin (*Ind. and Eng. Chem.*, **40**, 2, 280) to determine the effect of storage, under various atmospheres at an elevated temperature, on the retention of activity of various commercial active dried bakers' yeasts, it is apparent that storage in the absence of air results in the greatest retention of activity. The differences between vacuum, carbon dioxide, and nitrogen storage do not appear significant.

The greatest loss in activity occurs when the yeast is stored in the presence of an excess of air. The samples stored in full sealed containers (limited air and commercial pack) retain more activity than those stored in the presence of excess air, apparently because of the limited amount of air present in the containers. It was found that samples stored in full Erlenmeyer flasks duplicated the behaviour of the commercially packed samples.

The sample prepared by drying a commercial bakers' yeast lost activity rapidly under all storage conditions, although its original activity was equal to that of the other samples.

Milk Manufacture Recovery

Milk manufacture during the first half of 1948 showed an increase of 53 per cent. over the corresponding period last year and was the largest for several years. The total quantity used for manufacture throughout the United Kingdom from January to June was 131,100,000 gal., compared with 85,700,000 gal. in the first half of last year, an increase of 45,400,000 gal. The liquid market showed an expansion of only 14,800,000 gal. in the same period.

Manufacture of milk powder during the half-year was approximately treble the pre-war average over the whole year, and during the flush period (April to June) averaged well over 1,000 tons a week. This figure includes both skim and full cream milk powder. The product was attracting increased attention before the war, but the weekly output averaged only 370 tons. Considerable progress was made during the war and the weekly output in 1947 was 520 tons. That figure promises to be eclipsed this year, as production in the first six months was double that of the corresponding period last year.

Condensed milk is still the leading milk product manufactured in Britain. It gained that position before the war, when the comparatively high realisation price of milk used for this purpose attracted the attention of the Milk Marketing Board. The term "condensed milk" includes evaporated milk. Although production is still below the pre-war average of 3,500 tons a week, during the flush season this year it averaged 3,200 tons a week, and was well above the output for the corresponding season last year. In May this year the output averaged 4,250 tons weekly.

Butter manufacture continues to be but a shadow of its former self. Last year the total United Kingdom production was only 6,760 tons against a pre-war figure of 23,400 tons. This year the output promises to be no higher than in 1947, despite the large increase in the quantity of milk used for manufacturing purposes. Some creamery proprietors have expressed the view that butter manufacture is unlikely to regain pre-war dimensions for several years.

Production of cheese last year was approximately one-third of the pre-war output and two-thirds of the 1946 output. Before the war 50,000 tons were manufactured annually. As in the case of butter, commercial production on the farms

has almost ceased. Last year only 8 million gal. of milk were made into farmhouse cheese, and the members of the Cheshire Cheese Federation actually in production are few.

This year the manufacture of creamery cheese has shown some increase over 1947, production in June (the peak month) being 1,250 tons weekly—nearly double the figure for the corresponding period last year. Nevertheless, the total increase in the output of cheese during the first half of this year was not great, and the bulk of the extra 45,400,000 gal. used for manufacturing purposes was allocated to condensed milk and milk powder. There is no prospect of cream manufacture yet.

Flavour of Meat

In the course of an investigation of the seasoning of meat and meat-containing dishes, described by E. C. Crocker (*Food Research*, **13**, 3, 179), it was found that the literature did not offer any adequate description of the flavour of meat alone.

A study "using sensory methods and enough chemistry to interpret the findings" was initiated. The work covered specifically the influence of boiling and low-temperature heating, and did not include pyrogenic flavour development, such as occurs at the surface of meats during broiling, frying, or roasting or in juices browning in the pan.

The conclusions arrived at were that the flavour of raw meat is apparently due to the sweetness and saltiness of actual blood and only incidentally to the presence of creatine and creatinine, which only have weak tastes.

Most of the flavour of meat created by boiling or other low-temperature heating is presumably due to the "cracking" of amino acid units of the protein, particularly those of the fibre. No information gathered from this study indicated that the proteins are first broken down, by hydrolysis or other means, to peptones or to free amino acids before they are cracked. Possibly the cracking takes place in the main protein chains or in the "side chains."

The wide variety of amines, acids, and sulphur compounds, and possibly also phenols, released each in small proportion, implies that amino acid units of several types are changed during cooking. Some of the fragments released from the amino acids have taste, generally of sweet, salty, or bitter type, but the most conspicuous flavour elements present are odours. The flavour of cooked meat is thus predominantly odour.

Jam Today

"The rule is, jam tomorrow and jam yesterday—but never jam today" was the tantalising precept met by Alice in *Through the Looking-Glass*. But Mr. Strachey has altered all that—provided plum or plum and apple jam will do for the spread. In these austere post-war days we are back again to a plenitude of a common preserve which roused the soldier's song of World War I: "What do we want with eggs and ham, When we've got plum and apple jam?" Notwithstanding our preference for melon or melon and ginger, apricot, or strawberry, we have to be thankful for any small mercies off the ration. "Jam" can be an attractive term or the opposite, according to its context. Ever since Haliburton had his Yankee clockmaker Sam Slick describe the climate and connubial bliss in Paradise as "real jam," such expressions as "jam on it" and "money for jam" have contrasted with "traffic jam" and the crisis theme of "we're in a jam."

More obscure is the point where jam crept into the larder. Dr. Johnson's reference to "a very pretty sweetmeat" from blackcurrants and sugar gives little help. That it was a luxury the Reverend Balwhidder in Galt's *Annals of the Parish* shows in telling of West Indian sugar combined with many berry bushes in gardens bringing the fashion to make jam, "hitherto only known in the kitchens and confectionaries of the gentry."

"Sweet" Thoughts

Candy Floss is excluded by S.R. & O. from the Personal Points rationing scheme as from August 29. Its manufacture except under licence is still prohibited.

Bullseyes languish in the bottle,
Truffles tantalise our stare;
Yet take heart, my pointless children,
Candy floss is free as air.

Free as air—if you can get it,
But, Pease-blossom, Mustard-seed,
It must not be manufactured
Without licence, so take heed.

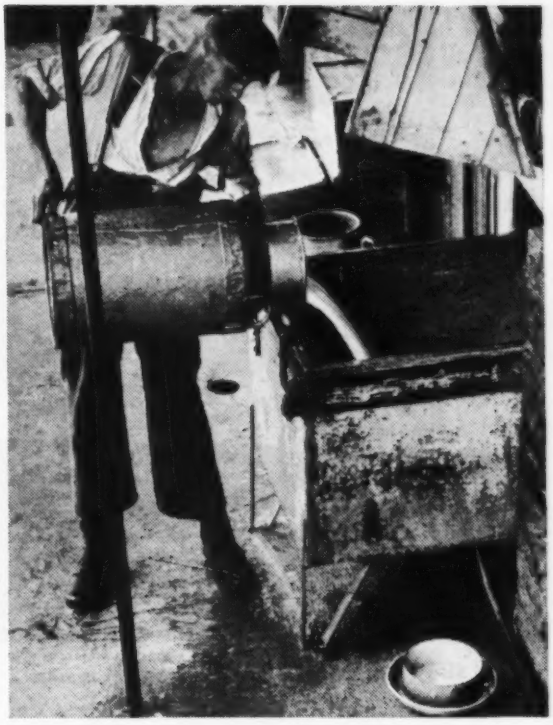
Without licence, Ariel, Puffball;
Whitehall's laws you must not cross
Lest a flighty act endanger
Our supplies of candy floss.

Wensleydale Cheese

Until comparatively recently, Wensleydale Cheese was very little known except in Yorkshire, where it was first made in the dale from which it takes its name. Its excellent qualities are gradually becoming more widely known, and it is now made in other parts of the country.

A TYPICAL Wensleydale is of the same shape as a Stilton and weighs 10 to 12 lb. When ripe the cheese should have a greyish-white skin with the mark of the bandage clearly showing, particularly where the bandage was stitched on. A smooth coat without ridges or marks denotes a hard, acid cheese. A good Wensleydale is soft and flaky, will spread like butter, and has the delicate blue veinings well distributed throughout the curd. The flavour is rich, sweet, and creamy—not acid or bitter.

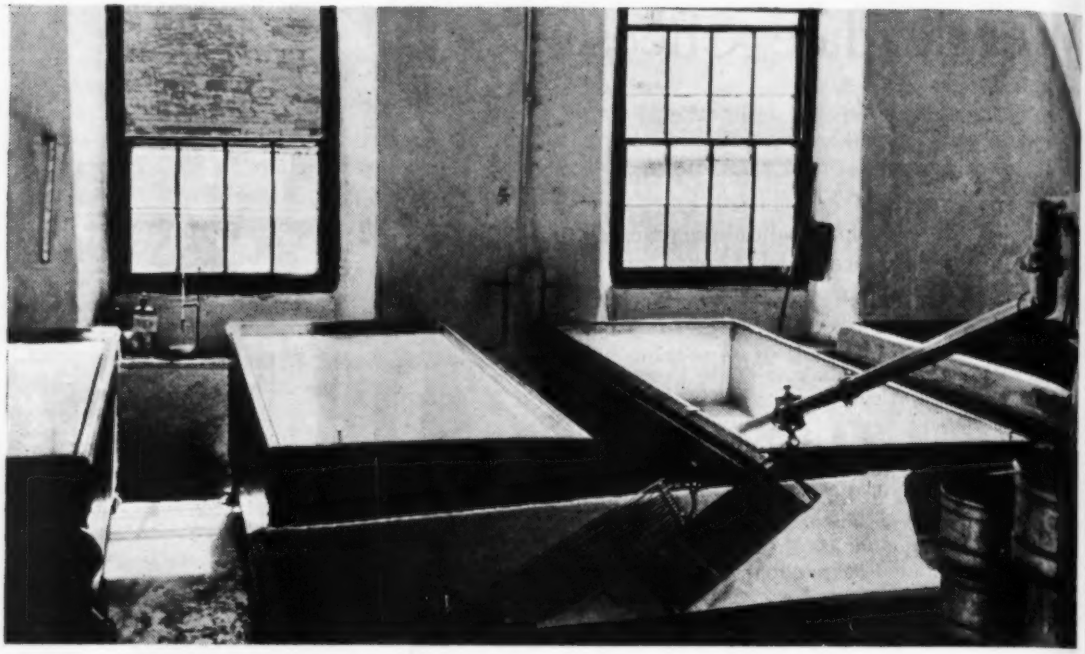
Evening's and morning's mixed milk is used. The greatest care must be taken in the treatment of the evening's milk, for if too much acidity is developed in the milk through being kept at a high



Above: The milk arrives at the factory.

Below: Milk is tested for acidity.

Starter is added to the milk, the amount varying from 1 to 3 oz. to every 12 gallons of milk.



General view of the dairy with milk souring in the vats.

The curd is cut lengthways and across with a widely set American vertical knife.

temperature, over-acidity in the early stage of making will follow, and this defect in the process is fatal to good results. The evening's milk is therefore cooled to 65° F. immediately it has been strained into the vat.

Next morning the cream is skimmed off, mixed with some new milk, and heated to 90° F., and then returned to the vat with the morning's milk, after which starter is added, the amount varying from 1 to 3 oz. (according to the time of year) to every 12 gal. of milk. The whole is then gradually heated to 84° F. and, when 0·18 per cent. to 0·19 per cent. of acidity has developed, the milk is ready for renneting.

Renneting

Rennet is added at the rate of 1 dram to 4 gal. of milk, or sufficient to coagulate the whole firmly enough for cutting in one hour. It is a mistake to add too much rennet, as this tends to firm the curd and to dry it too quickly. Care must be taken in adding the rennet as the proportion is so small. It is first diluted with twice its volume of cold water and is then stirred into the milk for at least eight minutes, after which the milk is stirred on the surface until signs of coagulation are noticed, which will usually be in ten minutes.

Treatment of Curd

The curd is cut with a widely set American vertical knife, first lengthways and then across,

and then allowed to settle for ten minutes, after which it is cut lengthways with the horizontal knife. Cutting must be very carefully performed to keep the particles of curd as whole as possible, and so prevent too rapid draining.

It should be remembered that this curd must be kept soft, and therefore very little stirring is necessary. It is advisable to stir the curd up gently from the bottom of the vat and then to allow it to settle for twenty minutes; it is then gently stirred for about twenty minutes and the temperature gradually raised to 86° F. during the stirring. When the whey shows 0·14 per cent. of acidity, the curd is allowed to pitch for half an hour, or until 0·14 per cent. of acidity has developed, when it is gently pulled back from the tap end of the vat and the whey slowly drawn off.

Cutting and Turning Process

When all or as much of the whey as possible has been drawn, the curd is scooped into cloths placed on a draining rack, sufficient curd for one cheese being placed in each cloth. At this stage the curd is soft but fairly free from moisture; care must be taken that it is not bruised or roughly handled when ladled out of the vat. The cloths are gently pulled up by the corners and formed into bundles, which are covered with cloths and left on the rack for twenty minutes. The bundles are then untied and the curd is cut into blocks about 4 in. square; these are carefully turned and again wrapped up. This cutting and turning is repeated every twenty minutes until the drainings from the curd show an acidity of 0·28 per cent. to 0·30 per cent. The curd should now be soft and flaky. The time taken to get the curd into this condition is usually about three hours from the time it is placed on the rack. The gradual draining and slow development of acidity is most important in the making of a perfect Wensleydale, for if the acidity develops too quickly a dry, crumbly cheese will result. Care must also be taken that the curd does not become chilled, as this checks the development of acidity and is the cause of weak, bad-flavoured cheese.

The curd is now weighed and broken up carefully by hand into pieces about the size of walnuts, after which salt is added at the rate of 1 oz. to every 4 lb. of curd. The salt must be thoroughly but gently mixed in and allowed to dissolve before commencing to mould.

Moulding and Pressing

The curd is placed loosely in the moulds (which are not lined) so that the texture of the cheese may be as open as possible. A handful of the smallest pieces of curd is placed in the bottom of the mould and also at the top, to ensure a smooth even surface on the ends and to prevent the ravages of mites. The drainings from the curd after moulding should show 0·3 per cent. to 0·35 per cent. of acidity.

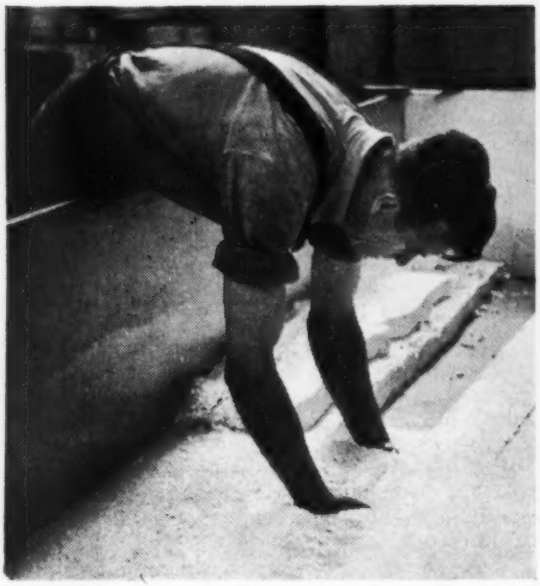
The cheese is left to drain, without any pressure, for two hours, after which it is removed from the mould, turned, placed in a cloth, and returned to the mould, where it remains overnight at a temperature of 65° F.

Next morning the cheese is turned, placed in a dry cloth, and put to press with 6 cwt. pressure for two hours. It is then taken out of the mould, a calico bandage is sewn on (using the special lock stitch), and the cheese returned to press for a further two hours, by which time it should be evenly pressed with the ends smooth and straight.

Ripening

Great care is necessary during the ripening period. The cheese must not be subjected to a high or uneven temperature or to a dry atmo-

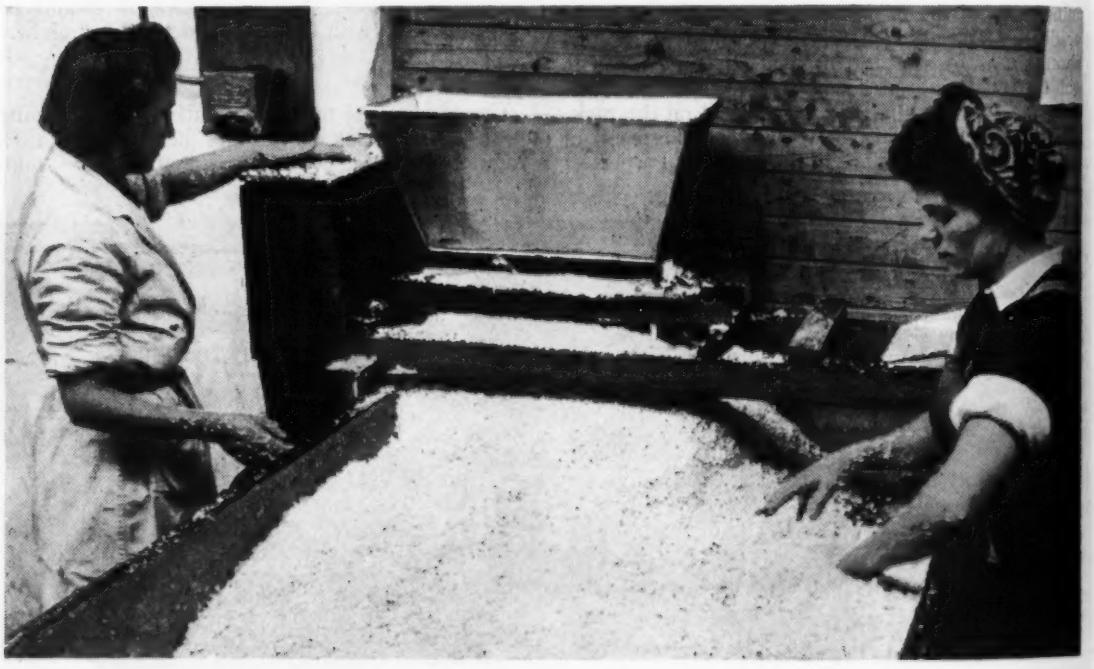
The curd is mixed in the vat.



The curd is lifted after the whey has been drawn off.

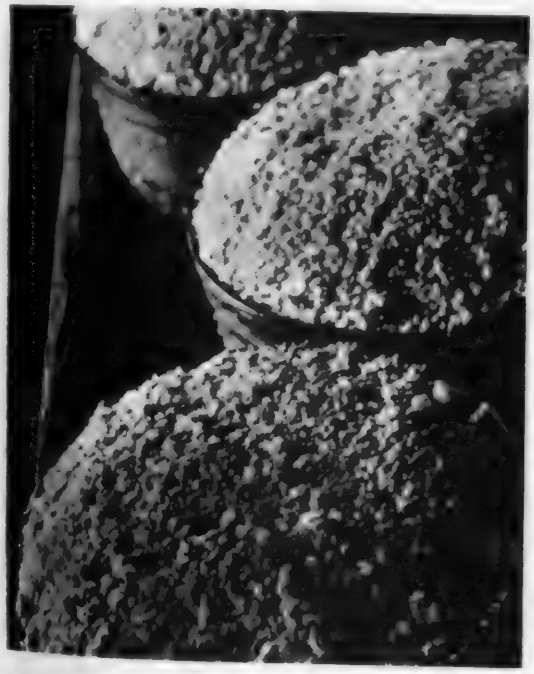
The curd is left in the vat to drain thoroughly.

sphere, and, for these reasons, ripening is best carried out in a cellar. The cheese is placed on the floor when first taken to the ripening room, to prevent the too rapid development of acidity and to allow for a gradual softening and mellowing of the curd. It is advisable to place a mould or a Stilton hoop over each cheese for a few days, because at this stage the curd is very soft and the cheese is apt to become misshapen. The cheese is turned every day for the first month or six weeks and then every alternate day until ripe. It should be ripe in about six months.



The curd is then ground.

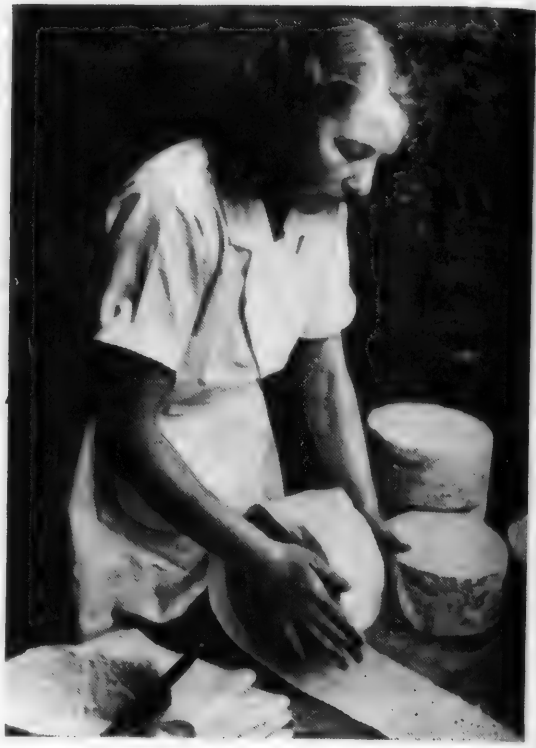
After grinding, the curd is filled into the moulds.



A close-up of the curd in the moulds.

The curd is pressed in the moulds.

The cheese is emptied from the mould.



Bandaging the cheese.

Storing and turning the cheese.

Average Acidities of the Cheese

	Per Cent.
At renneting	0·18–0·19
After pitching	0·13
At drawing whey	0·14
At breaking curd	0·28–0·30
Drainings from curd after moulding	0·30–0·35

Faults in Wensleydale Cheese-making

In the efforts to avoid taints, the importance of a regular supply of clean milk from healthy cows, together with sufficient cooling and transport, cannot be over-emphasised. Close texture, due to over-pressing, may produce faulty blueing. Other causes are too high acidity during making and uneven temperature and draught in the ripening-room.

Soft body may be due to lack of acidity, check in drainage due to chilling, and yeasts or faulty starter. Contaminated milk or starter, yeasts and moulds, or uneven temperatures during the early stages of ripening, may lead to discoloration.

Hard cheese may have several causes: (1) Low butterfat content; (2) over-acidity during making; (3) excess rennet; (4) high temperature during pressing and early stages of ripening, causing direct loss of fat.

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Laboratory Control of Jam Setting

IAN CAMERON, B.Sc.

Much has been written in recent years about the importance of the *p*H value of a jam in connexion with its setting power. From the practical point of view, however, it is a matter of some importance to know the correct *p*H required to produce the maximum setting in a preserve.

THE *p*H required to produce a good firm set in a jam or marmalade is not identical with that required to produce a good firm set in a pectin jelly (*p*H 3·30). Moreover, without abnormal metallic ion interference there is, for each type of jam, a *p*H range within which setting will take place and outside which setting is impossible and a *p*H value at which maximum setting will occur. The relevant *p*H ranges and optimum *p*H values for a number of jams are listed in Table I. It will be noticed that there is an interesting connexion between the optimum *p*H and the nature of the insoluble solids in the jam, the more "pippy" jams or those containing a proportion of whole fruit having the higher optimum *p*H.

In these experiments, the results of which are quoted in Table I, the measurements were made by means of a *p*H meter on a 20 per cent. aqueous solution of the jam. They do not, therefore, represent the *p*H of the jam itself, but they are not far removed from it, and as the same procedure was followed in estimating the *p*H required for the maximum setting of a pectin gel, the relationship observed between the optimum *p*H and the nature of the insoluble solids holds good. The pectin gel was made to a formula similar to one for jam, and differs from the normal jams (from an analytical viewpoint) only in the nature of its insoluble solids.

TABLE I

Type of Jam.	*p*H *Range.*	*Optimum* p*H.*
Apricot, Greengage, Damson, Plum	3·2-3·5	3·35
Apple and Damson, Apple and Plum	3·2-3·5	3·35
Apple and Raspberry ..	3·4-3·5	3·40
Orange Marmalade	3·4-3·5	3·40
Gooseberry	3·4-3·5	3·40
Blackcurrant	3·4-3·6	3·50
Seedless Bramble	3·4-3·6	3·50
Raspberry	3·5-3·7	3·60
Raspberry and Redcurrant ..	3·5-3·7	3·60
Strawberry	3·7	3·70

Although only a single set of figures is given in Table I for each type of jam, these figures were arrived at by a large number of experiments in the laboratory, backed by trial and production under factory conditions over a period of months. In many cases the *p*H of the jam was also determined independently by colorimetric methods, and the values so obtained were found to be in good agreement with those obtained via the *p*H meter.

Inclusion of "Buffers"

From the practical point of view also, it is necessary to control the *p*H of jams within these predetermined limits, and in the routine laboratory control of jam manufacture the *p*H of jams may be easily controlled by including in, or excluding from, the formula small amounts of "buffers." The most convenient and, indeed, most widely used "buffers" are (i) sodium bicarbonate, (ii) calcium carbonate or *creta praeparata*, (iii) citric acid, or (iv) tartaric acid. The first two of these may be called "alkaline buffers," and the second two "acid buffers." Buffers, however, must be used with some caution, and will in general produce the following results by their addition to the jam formula:

(*a*) Lower (acid buffer) or raise (alkaline buffer) the *p*H.

(*b*) Raise (acid buffer) or lower (alkaline buffer) the rate of inversion of the cane sugar during the jam boiling.

(*c*) Alkaline buffers, particularly sodium bicarbonate, tend to increase the setting time of the jam, although, if the optimum *p*H is attained, the final set will be just as firm as if the setting time were normal. Calcium carbonate or *creta praeparata* tends to produce a firmer set at the optimum *p*H than if the optimum *p*H were realised in its absence owing to the effect of the calcium ion on the setting of the pectin gel.

(*d*) Alkaline buffers decrease and acid buffers increase the rate of loss of sulphur dioxide during the jam boiling, an effect which is particularly noticeable in the manufacture of strawberry jam containing whole fruit.

The omission of acid or alkaline buffers from standard jam formulae will produce opposite results to those mentioned in (*a*) and (*b*) above.

In practice, however, the most important consideration in the use of buffers is the effect produced on the *p*H value and the degree of inversion, these being simultaneously affected.* Table II

* The cane sugar/invert sugar ratio must be kept fairly constant within the recognised limits for preventing crystallisation of one or the other of these sugars. See FOOD MANUFACTURE, January, 1946.

shows under what conditions buffers should be used to produce the required simultaneous effects on the degree of inversion and the *p*H value of the jam. In using the table, due regard must be paid to the effects mentioned under (*c*) and (*d*) above.

TABLE II

*p*H *Value.*	*Per Cent. Invert Sugar.*	*Action.*
(1) Raise.	Raise.	Replace some of the cane sugar in formula by invert syrup and add alkaline buffer at end of boil.
(2) Raise.	Lower.	Add alkaline buffer at beginning of boil.
(3) Lower.	Raise.	Add acid buffer at beginning of boil.
(4) Lower.	Lower.	Add acid buffer at end of boil. If invert syrup used in recipe, replace by cane sugar. Attempt to reduce boiling time by cutting water from formula.
(5) No change.	Raise.	Replace some of the cane sugar in recipe by invert syrup.
(6) No change.	Lower.	Add alkaline buffer at beginning of boil and equivalent amount of acid buffer at end of boil.
(7) Raise.	No change.	Add alkaline buffer at end of boil. If this produces fall of amount of invert sugar in finished jam, replace some of the cane sugar of formula by invert syrup.
(8) Lower.	No change.	Add acid buffer at end of boil. If this produces rise in amount of invert in the finished jam, attempt to reduce the boiling time by cutting water from formula, or alternatively replace any invert syrup in formula by cane sugar.

Degree of Inversion

The "actions" listed in Table II are by no means the only possible ones to take, but they are perhaps the most convenient, and reference to them will suggest appropriate action to meet individual cases. In taking action to control the *p*H and the invert sugar content of a jam to any desired value, the amount of buffer used should be cut to the minimum quantity necessary. Thus the procedure of adding an acid (or alkaline) buffer at the beginning of a boil to increase (or decrease) the degree of inversion of the cane sugar and then adding a quantity of alkaline (or acid) buffer at the end of the boil to raise (or lower) the *p*H value to its optimum should be avoided if possible. With this in mind it is worth mentioning that the degree of inversion is a function of (among other things) the boiling time and temperature. Any increase in these two factors will bring about an increase in the degree of inversion and *vice versa*. In Table II the boiling temperature (which may, and in the author's experience did, amount to the applied steam pressure) is considered to be constant and the boiling time is considered to be made variable by adding water to, or subtracting water from, the formula and boiling to a predetermined (about 69 per cent. to 70 per cent.) soluble solids content of the jam as measured by refractometer.

As to the amount of buffer to add to a jam formula, the author has found it best in practice to work in half-ounce units, one ounce of buffer per 100 lb. batch of jam producing a *p*H change of about 0·1 *p*H units.

Nature of the Pectin

There is one other factor which has to be taken into account in the guaranteeing of a good firm set in a preserve, and that is the nature of the pectin included in the jam formula either as the natural pectin present in the fruit or fruit pulp used or as additional pectin added as such.

Fruit pectin does not seem to be a definite chemical entity as different fruit pectins gel differently when treated under standard conditions. In the unhydrolysed condition, however, pectin is said to be a sugar substituted methoxylated galacturonic acid polymer, and it has been claimed on the one hand that the degree of methoxylation of the pectin molecule is a criterion of its setting power, and on the other hand the degree of polymerisation of the galacturonic acid units is said to be the chief factor concerned. However, in the author's opinion there is no single factor in the make-up of the pectin molecule which can be relegated to the position of the chief set-forming agent, and so, for routine purposes at any rate, estimations of the methoxyl content of the pectin or of its galacturonic acid content are to be avoided. A routine test that does give a good indication of the nature of a pectin in a fruit or fruit pulp, however—apart from a trial boil—is the examination of the appearance of the precipitate obtained when alcohol is added slowly to a concentrated aqueous extract of the pectin (*cf. Methods of Analysis A.O.A.C.*—"Alcohol Precipitate"). It is, however, only by the experience gained in the examination of a number of alcohol precipitates produced under standard conditions by the same person and by their correlation with the results of actual boils of the same fruit or fruit pulps under factory conditions that one can eventually draw reliable conclusions from the appearance of the alcohol precipitate.

Although there is doubt about which constituents of the pectin molecule are primarily responsible for the setting, there is no doubt that degradation of pectin present in a fruit takes place on standing, due to enzymic action. It is essential, therefore, if a good setting jam is to be made from the fruit at a later date, that this enzymic degradation of the pectin be cut to a minimum. With this fact in mind, a minimum of time should elapse between the picking of the fruit and either its manufacture into jam or its boiling, pulping, and barrelling in

SO_2. Experience in visual examination of whole fruit when it is bought, backed by the nature of the alcohol precipitate, gives a good indication of whether the enzymic action on the pectin has gone too far for the fruit to be useful. The pectin enzymes or pectases are destroyed on boiling.

Testing the Pectin Strength

With regard to pectin, which is to be added to the jam as such, this is best tested by making up a jelly under laboratory conditions approximating as closely as possible to the factory conditions. A suitable method is to boil 150 g. of liquid pectin (or its equivalent) with 485 ml. of water, 453·5 g. of sugar, and 0·9 g. of citric acid in a copper pan until the soluble solids, as measured by refractometer, are 69·0 per cent. plus or minus 0·5 per cent. The liquor is then poured into a standard tin box, covered with tissue, left for several hours at room temperature, and placed overnight in a refrigerator, when it can be tested by one or other of the standard jelly testing apparatus the following morning. The chief point here is that if standard conditions are rigorously adopted throughout the test, the figures obtained from the jelly testing apparatus will give a reliable indication of the strength of the pectin. Whether the figures obtained in this test are in accord with those obtained by other workers using slightly different technique is of no consequence so long as the figures are standard for the particular technique and apparatus used and can be correlated to the strength and stability of the pectin gel.

So much then for the methods of guaranteeing, in advance, a good firm set in a jam or marmalade. These methods will, however, be of no avail if anything untoward happens during the processing—for example, if a machinery breakdown results in the jam being handled when the gel is beginning to form. Any rough handling at this stage will destroy the structure of the gel and prevent its formation even if the optimum *p*H, etc., are realised. Finally it is assumed that the boiling time and temperature can be kept reasonably constant in the factory, that the weights of the ingredients in a given recipe are kept constant, and that the invert sugar used is fully inverted and neutral in reaction.

SUMMARY

1. The *p*H required to produce a good firm set in a jam is not the same as the *p*H required for a pectin jelly. For each jam there is an optimum *p*H at which maximum setting will occur, and this varies in an interesting manner with the nature of the insoluble solids of the jam.

2. In controlling the *p*H by the use of so-called "buffers," attention must be paid to the number of different simultaneous effects they produce, and

(*Concluded at foot of next column*)

Fish Canning in Eire

LACK of national awareness of the importance of a prosperous fish canning industry to a small country attempting to hold its own against the big industries of competing nations has been very evident in Eire. In 1947, however, brisling caught off the Irish coast were canned in Dublin. The same year saw another Dublin firm engaged in the canning of herrings, and (as was mentioned in FOOD MANUFACTURE, December, 1947) an up-to-date factory for the production of canned brisling and fish by-products is nearing completion at Killybegs, Co. Donegal.

These are the first attempts to realise the industrial possibilities behind the preservation of fish ever made in Eire. A considerable stimulus to enterprise was the high price obtainable for tinned fish and the great demand evidenced by Eire's increasing imports of canned Norwegian and American brisling, salmon, and pilchards packed either in oil or watery sauces.

If future expansion of the fish canning industry is contemplated, Irish fishing fleets will have to be reorganised and greatly supplemented. At present these fleets of necessity operate on a very small scale. The total number of people engaged in the Irish fishing industry is just over 10,000. Fishing craft are inadequate, being some 4,332, only 576 of which are motor vessels.

The above 1947 figures show an increase over those for 1945, however, and generous State financial support would soon remedy the evil of undercapitalisation from which the industry suffers.

Most of the fish caught on the Irish coast is at present handled by the Government-controlled and non-profit-making Irish Sea Fisheries Association, which has over seventy centres throughout the country for the packing and despatching of fish to market. Development of the Association's activities, which include the supplying of boats and full gear to fishermen on easy payment terms and the employment of agents at every port to supply boxes for the transport of fish, would help much to vitalise Irish fisheries.

(*Concluded from preceding column*)

a table is given describing the practical method of simultaneously controlling the *p*H and the amount of invert sugar required for the finished product.

3. The nature of the pectin used in the jam, either as the pectin natural to the fruit used or as additional pectin added as such, is an important factor in the guaranteeing of a good set, and care must be taken that enzymic degradation of the pectin has not proceeded too far. Methods for doing this are suggested.

4. Methods of predicting a good firm setting jam will be of no avail if any breakdown in the normal manufacturing procedure occurs in the factory.

Ministry of Food

Latest Statutory Rules and Orders

The list given below is the continuation of the list of Orders published in *Food Manufacture*, September 1, 1948, page 413.

No.	*Date.* 1948.	PRICE FIXATION ORDERS
1578	July 18.	Order amending the Pulse (Control and Prices) Order, 1943. Revokes S.R. & O. 1947, No. 2687; S.I. 1948, No. 620.
1685	Aug. 1.	Order amending the Feedingstuffs (Maximum Prices) Order, 1948.
1745	,, 1.	Order amending the Dredge Corn (Control and Prices) (Great Britain) Order, 1947.
1747	,, 1.	Order amending the Rye (Control and Prices) (Great Britain) Order, 1947, and the Rye (Control and Prices) (Northern Ireland) Order, 1947.
		COLD STORAGE
1614	July 17.	The Cold Storage (Control of Undertakings) (Charges) (No. 2) Order, 1948. Revokes S.R. & O. 1941, No. 268; 1944, No. 1089.
		FEEDINGSTUFFS
1855	Sept. 25.	The Feedingstuffs (National Pigeon Mixture) Order, 1948. Revokes S.R. & O. 1943, No. 516; S.I. 1948, No. 1205.
		FLOUR
1654	July 22.	Order amending the Flour Order, 1947.
		FRUIT
1628	July 26.	The Bananas Order, 1948. Revokes S.R. & O. 1945, No. 1551; 1946, No. 347; 1947, Nos. 37, 740, 1826.
1639	,, 18.	The Fruit Pulp Order, 1948. Revokes S.R. & O. 1945, No. 911; 1947, Nos. 1318, 1863.
		LABELLING
1438	June 24.	Order amending the Labelling of Food (General Licence) Order, 1947.
		MEALS IN ESTABLISHMENTS
1563	July 6.	Order amending the Meals in Establishments Order, 1946. Revokes S.R. & O. 1947, No. 1932.
		MILK
1384	June 24.	The Scottish Milk Marketing Boards (Modification of Functions) Order, 1948.
1686	July 25.	The Milk (Non-priority Allowance) (No. 4) Order, 1948. Revokes S.I. 1948, No. 1163.
		PERSONAL POINTS
1632	July 18.	The Rationing (Personal Points) Order, 1948.
		POINTS RATIONING
1290	June 16.	The Rationing (Personal Points) Order, 1947 (Directions No. 3) Order, 1948.
		POTATOES
1560	July 5.	The Ware Potatoes (1948 Crop) (Restrictions on Sales) Order, 1948.
		PRESERVATIVES
1118	May 25.	Order amending the Public Health (Preservatives, etc., in Food) Regulations, 1925.
		PRESERVES
1324	June 21.	Order amending the Preserves Order, 1947.
		RATIONING
1264	June 14.	The Food Rationing (General Provisions) Order, 1947 (General Licence No. 5) Order, 1948.
1631	July 18.	The Food Rationing (General Provisions) Order, 1948. Revokes the Food Rationing Orders, 1947.
1633	,, 18.	The Bacon (Rationing) Order, 1948.
1634	,, 18.	The Bread (Rationing) Order, 1948.
1635	,, 18.	The Meat (Rationing) Order, 1948.
1636	,, 18.	The Fats, Cheese, and Tea (Rationing) Order, 1948.
1637	,, 18.	The Sugar and Preserves (Rationing) Order, 1948.
		SACK CHARGES
1746	Aug. 1.	The Home-Grown Beans and Threshed Feeding Peas (Sack Charges) Order, 1948. Revokes S.R. & O. 1947, No. 1895.
		SEASONAL ALLOWANCES
1823	Aug. 9.	The Food (Seasonal Allowances) Order, 1948.
		SOFT DRINKS
1291	June 16.	Order amending the Soft Drinks Order, 1947.
		VEGETABLES
1215	June 9.	The Carrots (1948 Crops) (No. 1) Order, 1948. Revokes S.R. & O. 1947, Nos. 2327, 2636; S.I. 1948, No. 176.

Fruit and Vegetable Research

The storage of potatoes, the use of apple dip, apple scald and its control, refrigerated gas storage of home-grown pears, and the storage of plums were the subjects discussed at a conference at Sittingbourne, arranged by the Ditton Laboratory, Department of Scientific and Industrial Research.

STORING potatoes in clamps works in a sort of way, said Dr. Harold Wager of the Low Temperature Research Station, but there are strong objections to this method of storage:

1. The amount of cover required on a clamp depends on the sort of winter that the clamp has to face. The thickness of cover is, therefore, a guess, and how far out it may well be is shown by comparing last winter with the previous one.
2. In clamps there is no way of keeping the potatoes cool in the spring, and as a result they sprout.
3. Clamps may be either too wet or too dry.
4. Clamps can only be opened in dry and not frosty weather.
5. Cost of clamp construction and clearing up is considerable, and much straw is used.

There is always some loss of potatoes in clamps opened after March. If frost or water has got in the wastage may be high. Unfortunately no reliable figures are available for average wastage in late opened clamps; guesses vary from an average wastage of about 5 per cent. to 15 per cent. or even 20 per cent. Individual clamps vary from 2 to 3 per cent. wastage up to a total loss (*cf.* Wilson, A. R. and Boyd, A. E. W., Potato Wastage in Clamps, *Agriculture*, **51**, 507, 1945).

American Storage Methods

An alternative to clamps is storage in underground cellars, but this is not very practical on a large scale. In U.S.A. special potato store-houses are built, but this is partly a response to very cold winters. Recently, on the initiative of the Agricultural Research Council, a small group, consisting of a representative of the A.R.C., the N.F.U., and the D.S.I.R., was sent to the U.S.A. to study these store houses. These vary greatly in size; one under construction was for 20,000 tons, and many were for only a few hundred tons. In general they are relatively long and narrow, and they have well-insulated walls and roof with appropriate ventilators. The potatoes are stacked in great bins down either side of the house. The bins are up to 20 feet from front to back, up to 12 feet or 15 feet wide, and may be as high as 25 feet, but usually are only 8 feet to 14 feet or so. Between the bins is a central alley-way where grading can be carried out. Stoves are installed as supplementary heating, and cooling is effected by opening ventilators. The Agricultural Research Council has issued *Report of the Potato Storage Mission to the United States and Canada*. (H.M.S.O. Price 1s. 3d., by post 1s. 5d.)

Potatoes, like apples, generate heat continuously, and the removal of this heat from these large stacks of potatoes is a major problem. The potato stacks tend to be hottest near the centre, and so ventilation ducts have to be arranged.

Economics of Potato Storage

The problem in England is rather different from that of the American growers; we are as much concerned with keeping potatoes cool in spring as warm in winter. These problems are being studied by the Agricultural Research Council in close collaboration with the Department of Scientific and Industrial Research.

How far would a permanent potato store-house be likely to be of use under English conditions?

1. Potatoes could be dried off in the autumn if need be.
2. They could be kept warm in cold weather.
3. Some degree of cooling in warm weather might be possible—by night air or by forced ventilation.
4. Grading could be done in wet or cold weather so that labour could be more effectively used.
5. Some reduction of rotting might be possible as well as some reduction in sprouting as compared with clamps.
6. No yearly wastage of materials would be incurred.

The alley-way of an American potato store. The slatted wooden bins are full and potatoes are also being piled to a low height in the alley-way. *Photo courtesy Dr. A. R. Wilson.*

Machine for spraying apples with the skin coating. The part of the machine in the foreground is the feed-belt section. The box-like structure over the second section is the spray-chamber with the feed-tank to the spray-gun immediately behind it.

Some of these points are of considerable weight, but against them may be set certain disadvantages. The permanent store would be expensive to construct and would necessitate carting the potatoes during the harvesting operation. Some handling machinery would be required to fill and empty the bin, which would add to the capital cost. The design of suitable handling machinery is a serious problem, since damage to potatoes must be reduced to a minimum to avoid subsequent rotting.

The economics of such a store are involved, and figures, which are affected by grading standards, use of special grading machinery, more efficient use of labour, and so on, are difficult to obtain at present.

Little is known at the present time about the design of a store suitable for English operating conditions, insulation, size of bin, and ventilation.

Another possible line of development in potato storage, which is partly linked with the above, is the use of chemicals either to prevent rotting or to prevent or retard sprouting in the spring. So far as rotting is concerned, at present the prevention of dry rot is the only reasonable practicable chemical treatment. This is of interest mainly to growers of seed.

Avoidance of Sprouting

If sprouting in spring could be prevented or considerably retarded, there would be less loss by the weight of the sprouts and also by the food consumed in their production during storage. To this may be added the increased ease of grading of late-stored potatoes. Sprout inhibition is possible on a laboratory scale at present, and efforts are being made to apply it to commercial storage. The addition of chemicals may well prove to be possible in one type of store and not in another, and so this development may influence the storage practices in the future.

Investigation of all these problems is in the embryo stage, but they are all being tackled at present in this country by different groups of workers. Results are likely to be slow as there is only one potato crop a year and so only one experiment. Experience must be gained over several seasons and with different varieties and qualities of potatoes before advice can be given, and the final judgment will not be reached until growers have tried it out in various parts of the country.

That storage practice in the future may be vastly different from the current methods was Dr. Wager's opinion.

The Use of Apple Dips

Dr. A. C. Hulme gave a description of what an apple dip is and how the skin coating, which is formed on the apple after dipping, modifies the ripening changes of the fruit in a manner analogous to gas storage. It was stated that recent results obtained in this country as well as trials in Holland suggest that there is a definite commercial future for apple dips. But it was emphasised that, for reasons given, the extension of storage life obtained with skin coatings is never likely to be so long as that obtained in gas storage. At constant cool temperature skin-coated Cox's Orange Pippin apples have been kept in excellent condition until the end of February, but not much longer.

Since it is now clear that the best method of applying these oil emulsions to fruit is in the form of a spray, the term "skin coatings" is preferable to "apple dips."

The results of a trial, carried out in Essex on 40 tons of Cox's Orange Pippins in co-operation with a group of growers, were described. In this trial an experimental coating machine, constructed by a Maidstone firm and having a throughput of 300 to 400 bushels per day, was used.

The use of skin coatings, incorporating a fungicide to reduce losses from brown rot, was discussed.

Apple Scald and its Control

Scald is an important disease of apples in cold storage, taking the form of a superficial browning of the skin. Dr. J. C. Fidler, in his paper, said that a bad scald year may mean a heavy loss for the farmer. It is thought to be caused by the action of odorous volatile products given off by the fruit in very small quantities. The normal method of controlling the disease is to wrap the apples in paper impregnated with oil; research now in progress aims at preventing the disease without all this labour. The aim is to circulate the air of the store through filters based on the same principles as are employed in gas masks and thus absorb the vapours which are dangerous to the fruit. It may be possible to prevent scald by circulating the atmosphere of the store through such a filter.

Refrigerated Gas-storage of Home-grown Pears

The considerable extension of the storage life of home-grown Conference, Comice, and Williams pears obtained by the use of atmospheres containing lower percentages of oxygen (2·5 per cent. to 10 per cent.) and higher percentages of carbon dioxide (5 per cent. to 10 per cent.) than those normally present in air was described by Dr. C. West. Temperatures as low as 31·5° F. can safely be employed, pears being more tolerant of low temperature than most varieties of apples.

The optimum storage conditions for these three varieties are as follows:

	Storage Conditions.			
Variety.	*Temperature.*	*Atmosphere.*		
		CO_2	O_2	N_2
Conference	34° F.	5%	2-3%	92-93%
Doyenne du Comice ..	32° F.	10%	2-3%	87-88%
Williams' Bon Chrétien	32° F.	10%	11%	79%

The pears should all be ripened in air at a temperature of 60° F. to 65° F. The importance of the ripening temperature must be stressed because it is likely that fruit removed from storage during the winter months will be kept at temperatures too low for the development of optimum flavour and quality.

The Storage of Plums

In the past, storage of plums has not always proved satisfactory, because the fruit frequently does not ripen normally, becoming flavourless, soft, and lacking juice. Mr. W. H. Smith reported that the best results have been obtained by storage at a temperature of 34° F. At this temperature Victoria plums can be kept for three weeks. It has now been found that a longer period of storage is possible at the lower temperature of 31° F. if the plums are warmed up to 65° F. for a couple of days in the middle of the third week. In the laboratory it has been possible to extend the life of the fruit from five to six weeks, nearly double the original time. However, certain difficulties will be met commercially in warming a large bulk of several tons of the fruit. If plums are warmed too quickly they become wet with condensed moisture and brown rot is apt to follow. It is not yet known whether slow warming will have the same effect as the rapid warming employed in laboratory experiments, but the possibilities of commercial handling are being energetically explored.

Curious Herbs

On the postulate that the food of every living creature depends on the vegetable kingdom, yet another book* has been written to champion the cause of herbs—though "herbs" in this case has an usually wide meaning. It is solely the first half of the work, under the caption "Nutritious Herbs," that comes within the province of food. In this section the whole alphabet from "Agar-Agar" and "Almond" to "Walnut" and "Wheat" has been gone through in this crusade to get back to vegetable foods, to try and prove that "sophistication unfortunately has lost us not only our paregorics, but a great deal of our natural food."

Perhaps, as expected from a title recalling a picaresque part of our history, one views this book as strange in parts of the content and equally strange in general treatment. Since, in an early part of the text, both olive and palm (hardly herbs) are emphasised for their invaluable oil, why not sunflower, and why not groundnuts or *Arachis Hypogoeia*, known decades before Mr. Strachey pronounced his blessing on the (hoped for) crop? The highbrow name for monkey-nut would sound quite well in a work which includes so many classical names, natural orders, and terms used in various countries. Is palm oil, that is, "oil from the terminal buds of the coconut palm" really a substitute for cod liver oil? And why, one asks further, do we find among "nutritious herbs" such strange company as Mitillary, Lady's Slipper, and particularly kava-kava?—a local anaesthetic, "taken in too large doses it finally paralyses the respiration. It is not a plant for the amateur to experiment with." One is surprised to hear that "all sugars are natural heart tonics for the aged, and this is why liqueurs were invented to fortify Louis XIV in his old age." In surveying plants yielding sugar there is the fallacious condemnation of beet sugar: "The best sugar comes from the maple and sugar-cane—not the granulated sugar with which we are familiar today, which is made from beet sugar and is very inferior." Agar-agar is simply a white seaweed from the East India coast

* *Elixirs of Life*. By C. F. Leyel. London. Pp. 221. Price 16s. net.

and sent to China; British agar-agar is ignored, though a curious carbohydrate called "glose" pops up as a constituent.

There is much comparable strange matter dealing with lucerne, for example, which is, we are told, equally nourishing for human beings, "especially those suffering from loss of weight." There is a tendency to flit about from the almond tree to "green almond tarts" in a book not concerned with recipes. The book may prove useful as reference for enquirers into variety of name given to particular plants, or as reminder of facts long forgotten. If anyone is interested in Gold of Pleasure, used by Romans for oil and very nutritious for cattle, here is the volume for his shelves. The tendency is to skip the jumbled references to edible oils and sugar producers and turn from "Lotus" to "Food of the Lotus-Eaters, long confused with the sacred lotus of China." We hear how the real food of the lotus-eaters was the Jujube tree used today in Jereed to make bread and wine, and which still grows in that tract of Africa which the Libyan Lotophagi occupied in the days of Homer's *Odyssey*.—M. S.

Citrus Fruit Juices Control

THE Advisory Committee has now received further information with regard to the total imports of citrus fruit juices, which it is contemplated will arrive under the current year's programme.

Dealing specifically with varieties as the position is known today, the Committee reports as follows.

Lemon. Provision was made in the import programme for ample supplies to meet the requirements of the industry, and the quantities specified by allottees when deciding the varieties in which they would prefer to receive the 140 per cent. of their 1939 purchases have already been met in full. In addition, the applications originally made for lemon juice under Form CFJ/M have been for the most part allocated in full. These allocations will be completed at a relatively early date. The further applications arising out of the Secretaries' letter of June 3, 1948, are now having the attention of the Advisory Committee, and it is contemplated that allotments will represent approximately 70 per cent. of the applications received.

Orange. Demands for this variety were very heavy and were much in excess of the original import programme figure. Although every effort has been made to increase purchases from all available sources to enable the deficiency to be met, it will be impossible to meet in full all requirements. Quantities which were specified by allottees in their total figure of 140 per cent. of their 1939 purchases will, however, be met in full plus any juice which is required in replacement of licensed exports.

Grapefruit. The difficulties in Palestine seriously interfered with the supplies of grapefruit juice, and it has not been possible to make up the deficiencies from other sources. The allocations to datum period allottees will be about 40 per cent of their applications. It is the Committee's intention, if supplies will permit, to offer orange juice in lieu of the balance of grapefruit juice which will not be forthcoming.

Lime. It has proved to be an extremely difficult year for lime juice in that the 1947 autumn crop was short and the 1948 spring crop was disappointing. This situation has created a severe shortage of juice available for distribution to allottees during the spring and summer of the current year. It is hoped that the 1948 autumn crop will be a normal one, and should this be the case lime juice will be available in good supply during the latter months of 1948.

Provision has to be made for the replacement of juices used by manufacturers from their stocks for export purposes, and while lemon and orange juice should present no difficulty grapefruit and lime juice will be short for replacement purposes. The Advisory Committee hopes, in such cases, to offer lemon or orange juice to those concerned.

As is mentioned in paragraph 7 of Form CFJ/M, the Committee is anxious to recommend to the Ministry that the de-control of the distribution of fruit juice is practicable at an early date. No decision on this important matter has, however, been possible owing to the continued shortage of juice compared with the rising demand. The Committee is actively investigating the 1949 position and the many questions which may affect the supply of fruit juice. A further communication will be sent to all concerned on this matter as soon as a decision has been taken by the Advisory Committe working in conjunction with the Ministry of Food.

BOOKS RECEIVED

Orders for any of the books listed below or reviewed in this issue may be placed with the Books Department, FOOD MANUFACTURE, *17, Stratford Place, London W.1. It is regretted that under present conditions it is not always possible to supply books by return of post.*

Nuts, Their Production and Everyday Uses. By F. N. Howes, D.Sc. Pp. 264. London. Illustrated. Price 18s. net.

Cold Storage Practice. By A. E. Miller, M.S.E., M.Inst.R. Pp. 246+xi. London. Illustrated. Price 27s. net.

Cooking in Ten Minutes. By Edouard de Pomiane. Pp. 145. Oxford and U.S.A. Illustrated. Price 9s. net.

Industry Builder. By Robert E. Jones. Pp. 233. U.S.A. Illustrated. Price $4.

Sausage and Small Goods Production. By Frank Gerrard, M.Inst.M., M.Inst.R., M.R.San.I. Third edition. Pp. 208+xvi. London. Price 15s. net.

Hop Production in South Africa

R. SCHAUDER, B.Sc.

The hop industry in South Africa has been developed during the last twenty-five years, but it is only recently that production has been sufficent to make an important contribution to the requirements of the country. During the war years hops produced locally played a more important role than ever in meeting local demands, and the recent crop was the largest on record.

ALTHOUGH hop production is a relatively recent development in South Africa, attempts to cultivate the hop were made over a hundred years ago. These early experiments were made in the George District, where hops are cultivated today, this being the only district in South Africa where the industry flourishes. For all practical purposes, therefore, George is regarded as the Kent of South Africa.

George is situated about forty miles inland on the south coast. In the immediate background are the Outeniqua Mountains, and the area has an annual rainfall of over 30 in., a moist climate which is typical of the coastal forest belt in which George District lies, and soil which is generally of a sour character.

Founding of a Successful Industry

Some of the earliest settlers in the region apparently realised that conditions were favourable for hop growing, and crops were reaped as far back as 1831, but lack of transport and absence of suitable markets gave no stimulus for continuous development. It is possible, however, that relatively poor yields and prejudice against the local product were partly responsible for the lack of interest in the crop. Today about 1,000 lb. of dry hops per acre are obtained under favourable conditions, but for many years it was possible to obtain only about half this yield.

In an attempt to improve the yield of hops, many different varieties were experimented with, and for this purpose specimens were imported from all over the world. About twenty-four years ago it was found that certain unidentified species on reaching maturity gave a yield of hops which was a considerable improvement over that obtained hitherto. Cuttings from these plants were subsequently propagated and gave the same results as the parent stock. Using these plants as the basic stock, plantations were laid out and this variety, called Golden Cluster, has created a successful industry. But for this research it is doubtful whether South Africa would have a hop industry today.

The hop crop is harvested about March, and once a plant has been established it will yield many successive crops. The large coloured population at George is able to provide adequate casual labour at harvesting time, and this has played a large part in contributing towards the success of the industry.

A method of supporting upper growth of hop vines.

Harvesting the Crop

The plants are cut down to a height of about 4 feet, and bundles of foliage are taken by the workers to selected spots in the plantation where the flowers are removed and collected in hessian hammocks. The laborious nature of the task will be appreciated when it is realised that the ratio of the weight of green hops to dried hops is 4:1.

When the hops are harvested it is not possible to save the twine to which the plant has become established, and this must be renewed annually.

A hop oven in a plantation at George.

Clearing the Plantation

After harvesting has been completed the plantation is cleared up and young plants are replanted. In due course the hop plant commences to grow again. Meanwhile it is fertilised with natural or chemical manures containing nitrogen and phosphorus. In the twelve-monthly period cultivation of the ground around and between the hop plants is most important. This is usually accomplished by means of harrows drawn by mules, but some plantations use harrows drawn by garden-type tractors which are directed by a worker from behind.

Drying Operation

The hops are not allowed to remain in the green state too long after harvesting otherwise deterioration may result, and usually not more than twenty-four hours are allowed to elapse before drying in brick ovens is commenced. Large quantities of hops, placed in bags, are laid in the upper portions of the oven on perforated floors through which hot air is circulated from the fire below. This process takes about twelve hours to complete. The dried hops are then placed in screw-type presses and baled, and then despatched for consumption.

Increase in Local Production

As in most other countries, hops in South Africa are consumed mainly by the brewers. The requirements of this industry were previously imported, but in addition to the research conducted in previous years, the war period gave an incentive to local production, with the result that it is now possible to grow the entire South African requirements locally. There is no reason why this production should not be maintained in the future; in fact, there is every possibility that production will be increased, in which event the Union may for the first time enter the export market. Disease has not attacked plants yet, and the only limiting factor for the future from an agricultural point of view is drought, which occurs periodically and results in decreased yields.

At the present time local hops realise a price of £345, and while this is much higher than the pre-war figure, it is much lower than the price demanded by other countries today. As far as quality is concerned, according to authorities in England, South African hops compare favourably with those grown in England.

No article on hop production in South Africa would be complete without reference to the work done by Mr. E. Baker, a botanist in the Union Department of Agriculture and Forestry. In 1926, when he was first stationed at George, the hop industry was largely in its infancy. His enthusiasm and interest in the crop was so great that he induced the government to establish a research station there, and he was directly responsible for establishing the species of hops which now flourishes so well.

Island's New Industry

THE abundance of crawfish found by a recent scientific expedition sent to Tristan da Cunha is to be the means of bringing modern civilisation to the isolated inhabitants of that island. Two cold-storage factories—one on the site of the present settlement at Tristan, and a second and larger one at Sandy Point on the now uninhabited side of the island—are to be established, and the target aimed at is officially stated to be an annual production of 50,000 cases of frozen crawfish tails, representing approximately 1,600,000 crawfish. The Fisheries Development Corporation, who have obtained concessions to operate in the waters surrounding the island, intend to inaugurate social services, economic reorganisation, and education, as well as medical facilities. An agricultural expert is also to be employed for the purpose of increasing and expanding the island's food production to compensate for the decrease in agricultural labour as the island men are increasingly absorbed into the fishing industry.

Additional exploration of crawfish grounds is being conducted around the islands of Ascension and St. Helena, and reports have been very optimistic.

Recent Experiments in the Salt Curing of Herrings

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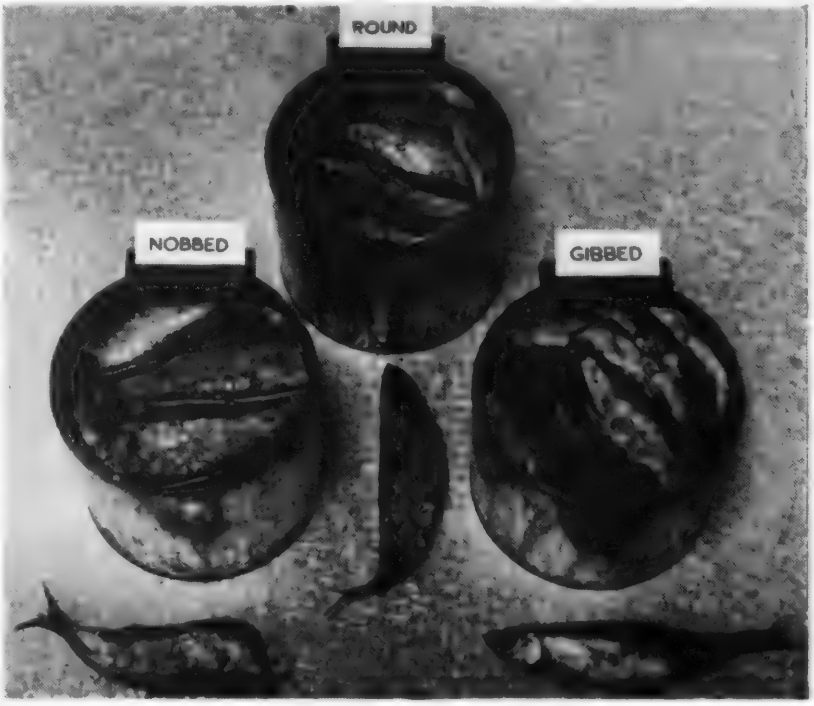
At the instigation of the Herring Industry Board, experiments in the salt curing of herrings were carried out some time ago at the Torry Research Station. The object was to assess the possibility of solving along certain lines which suggested themselves some of the more important technological problems that now apparently confront the industry. This article outlines these problems, describes the experiments and the results obtained, and discusses their implications.

GRADUALLY establishing itself as the earlier Dutch monopoly declined, the British industry reached its peak in 1913-1914, when about three million barrels of salt-cured herring—about 70 per cent. of a total catch of some 600,000 tons—were exported, mainly to Central and Eastern Europe. In the interval between the two World Wars, the development of policies of self-sufficiency in Germany, Russia, and Poland, and the generally unsettled conditions in the export market brought about an almost catastrophic decline in the fortunes of the trade, which has never recovered its pre-1914 volume and importance. However, the possibility of a revival of trade may be affected in the future by national policies or international agreements and trading conditions, but it is certain that the quality of the British product must be maintained at the highest possible level and the form in which it is presented be specially attractive to and convenient for the consumer. There is a considerable body of trade opinion which holds that the traditional large barrel units should be replaced by smaller, more elegant and convenient user or consumer packs, containing only carefully selected fish. A move in this direction had indeed already begun in this and other curing countries prior to the Second World War.

The loss of former large markets is not, however, the only difficulty facing the industry. It is today struggling to fulfil what orders it has under many handicaps, the chief of which are the scarcity of materials and the increasing shortage of skilled labour.

Packaging Research

The general shortage of wood, so urgently needed for housing, together with rising costs in barrel production, has inevitably encouraged enquiry re-



Three different packs of herring.

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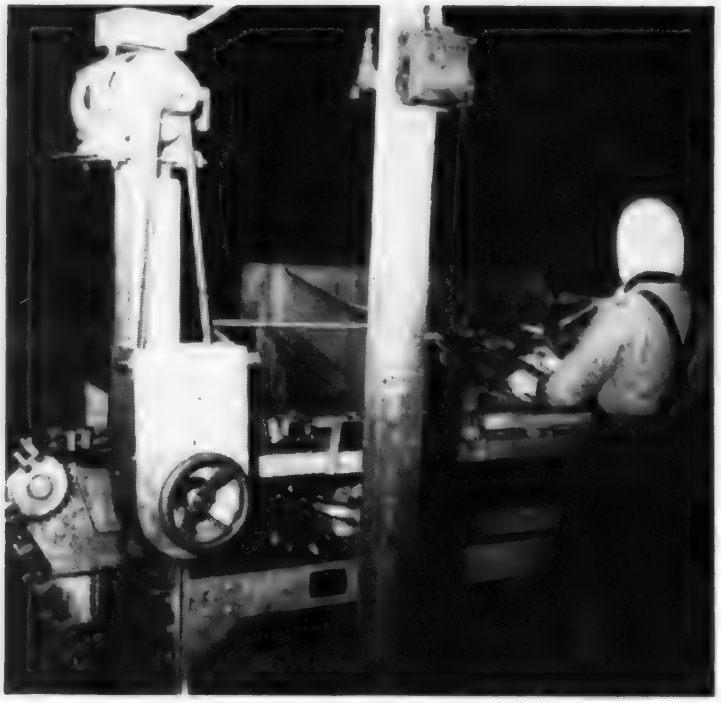

The herrings are fed into the nobbing machine.

garding the possibility of using other types of packaging material.

Only certain kinds of wood—notably certain spruces and firs—are apparently suitable for making herring barrels, although attempts are being made to render other types of wood useful by impregnation with wax or plastic materials. The use of plastics with paper or fabric bases is also being investigated. There is a hard-dying prejudice in favour of wood, which, in the opinion of some curers at least, is necessary for some unexplained reason for the development of a properly flavoured cure. Apart, however, from what is unfounded prejudice in favour of contact with wood, as indicated by the results below, a number of obstacles must be surmounted before a satisfactory substitute material can be developed. Typical difficulties are the heaviness of some of the new materials compared with wood, the presence in some of them of odorous substances, *e.g.* phenolic, which are absorbed by the fish, and the inability of some to withstand mechanical shock or to resist salt brines.

Labour Problems

The shortage of skilled labour is perhaps an even greater handicap. The decline in the trade between the wars, which led to fewer girls being trained as "gibbers" and packers, and a shift to more lucrative employment in more attractive industries, not involving travelling from place to place, have been mainly responsible for the shortage.

The introduction of a machine for "gibbing" (*i.e.* removing gills and gut) employing unskilled labour would seem to be the appropriate solution. The performance of one such machine, during the curing season at East Anglia, is reported by the Herring Industry Board in their Eleventh Annual Report to have been highly satisfactory.

The "nobbing" of herrings (*i.e.* removal of head and gut), by a machine, fed by unskilled workers, is already a well-recognised procedure in preparing the fish for canning. There is, however, a fairly general prejudice in the curing trade in this country against curing "nobbed" herrings; although this is increasingly being done by the Icelanders, Norwegians, and the Dutch, who seem to find ready markets for their products. "Nobbing" has special advantages over "gibbing" in that it affords a greater concentration of edible material per container and at the same time an increased supply of offal for the manufacture of meal and oil.

A shortcoming of both "gibbing" and "nobbing" machines in their present stage of development is that they do not grade the herrings in relation to size and maturity as the skilled fish worker does; but this does not appear to be an insurmountable difficulty. In any case, many traders consider that there are too many grades of cured herring, and that the number could be reduced with advantage. Moreover, grading, combined with rigorous inspection, might well in future be deferred until consignments are being finally packed just prior to export.

Rationalising the Industry

The time seemed to be ripe for a new approach for exploring scientifically the possibilities of "rationalising" the salt-curing industry to meet the exigencies of the situation that has just been described. The new way was envisaged as involving mechanical pretreatment, "gibbing," or "nobbing"; salt curing and storage in vats or tanks, not necessarily wooden, thus avoiding skilled packing in barrels; and finally inspection, grading, and packing in attractive and convenient containers for export.

The development of machines and the search for new packaging materials were already being pursued by the Herring Industry Board. It was decided, therefore, in consultation with the Board, to

concentrate on the following problems relating mainly to the quality of the cure itself. Is the presence of wood, as such, essential to the production of a good cure? How do "round," "gibbed," and "nobbed" herrings cured in the same manner compare in quality? How does the product of "tank" curing, which, incidentally, is already used in preparing "red" herrings, compare in quality with that of the traditional curing in barrels? Although no investigation of containers for the cured fish was proposed, a supply of one particular type of small lacquered tinplate container was available, and this was used for storage of the cured fish, and data regarding its suitability therefore obtained.

Search for New Packing Materials

The experiments were begun at Peterhead in July, 1946. Herrings caught off Peterhead were, after a preliminary "rouse" on the quayside, divided into three groups, one being "nobbed" by machine, another being "gibbed" by hand in the normal way, and the third being left in the "round" or ungutted condition.

In turn, each of these groups was again divided into three lots. One lot was prepared and packed with salt into barrels in the manner traditionally employed with "gibbed" fish. Another lot, after further "rousing" with salt on a clean concrete floor, was shovelled into an enamelled bath, of 60 to 70 gal. capacity, containing 10 gal. of brine, 95 per cent. to 100 per cent. saturated. The third lot, after similar "rousing," was shovelled into a wooden vat (capacity 80 gal.), also containing 10 gal. of brine, 95 per cent. to 100 per cent. saturated. Solid salt was added to both baths and vats, so that finally the ratio of fish to salt present was the same as that used in packing the first lot into barrels. Grids were used to keep the herrings always under the brine, asbestos plasterboard grids in the enamelled baths and wooden grids in the wooden vats.

Brine strengths were checked by brineometer every day for about a fortnight, and salt added if the strength fell below 95 per cent. The only under-strength pickles were formed by the "nobbed" herrings during the first seven to ten days, and this was thought to be due to some loss of initial "rousing" salt and retention of a large amount of machine-washing water during the "nobbing" process. The brine strengths reached equilibrium in all lots after fourteen to eighteen days, after which time the barrelled lots were topped up in the usual manner.

All the cures remained in the open-curing shed until November, the air temperature ranging from 7·5° C. to 25° C. (45·5° F. to 77° F.)—average about 15° C. (59° F.). The various lots were then packed into special lacquered, cylindrical, lever-lid tins holding about 10 lb. of cured fish.

One portion of each of the "gibbed," "nobbed," and "round" fish, packed originally in barrels, was repacked into half-barrels to be used as controls.

All lots were then removed to the Torry Research Station for further storage in an outside shed. From November till March the air temperature ranged from −2° C. to 10° C. (28·4° F. to 50° F.)—average about 3° C. (37·4° F.); during April and May it ranged from 5° C. to 15° C. (41° F. to 59° F.)—average about 10° C. (50° F.).

There were thus, finally, twelve lots of cured herrings to be compared; three lots ("gibbed," "nobbed," and "round") cured in three types of container (barrels, wooden, and non-wooden tanks), each individual lot being finally packed into 10 lb. tins; and three further lots ("gibbed," "nobbed," and "round") packed in wooden barrels in the usual way and used as controls. In October, 1946, before final packing, the cures were examined for general quality by staff of the Torry Research Station only. In February, March, and May, 1947,

Close-up of the nobbing machine.

all twelve lots were examined by a small panel of expert curers as well as by Torry staff.

In addition, certain chemical and bacteriological tests were made at intervals during the whole course of the experiment.

All judges were agreed that there was no detectable difference between the "wood" and the "non-wood" cures.

Results of Tests

The experts considered that the "round" fish had yielded a less satisfactory cure in all cases than the "gibbed" or "nobbed" fish, and one that would not make the grade in most markets. The odour was "gutty," the flavour poor, the flesh dark, and the milts and roes grey and discoloured. The fish did not stand up well to repacking in tins, being very soft in the flesh and frequently tearing at the belly. At the March examination all were agreed that the "round" fish were showing signs of spoilage and would soon become inedible in the approaching warmer weather. In fact, at the May examination these fish were showing such obvious spoilage (strong "off" odours, very soft flesh, and "torn bellies") that the panel did not examine them more closely.

At all four examinations it was concluded that there was little material difference in quality between the "gibbed" and the "nobbed" fish. Both lots were pronounced to be excellent, and it was considered that they would be good commercial propositions, even although the "nobbed" cure would be a novel product. In this connexion some of the judges commented unfavourably upon the unusually light-coloured, "bloodless" pickle formed in the cures of "nobbed" fish, since this sort of pickle is usually associated in the trade with incipient spoilage. Moreover, at the March examination, some of the curers thought that all the "nobbed" lots had a slightly sweet or "sharp" flavour, which, although very palatable and known to be specially relished by some consumers, is often taken to indicate some incipient putrefaction. It should be pointed out, however, that in the case of products resulting from a new procedure, not all of the old criteria of quality necessarily hold and allowance must be made for this.

"Nobbed" v. "Gibbed"

At the May examination, in order to avoid distraction by the novel appearance of the "nobbed" cures and hence a possibly biased judgment, the heads of the "gibbed" fish with which comparison was made were removed before the two types of cure were presented under code to the panel. Unfortunately, only two experts were present on this occasion, but they both agreed that it was impossible to distinguish in any way between the "gibbed" and the "nobbed" cures.

No difference could be detected at any of the examinations between the lots cured in barrels and those cured in vats or baths. Although some of the fish taken from the latter were somewhat misshapen, no adverse comments on this score were made by any of the experts regarding the condition of the final packs in the tin containers.

With regard to the containers, the manufacturer's representative was of the opinion that the lacquered interiors had stood up well. No signs of corrosion were visible until the May examination, when a few tins exhibited spots resembling sulphide stains These were later identified as the result of "detinning" due to breaks in the lacquer film. It is understood that a more durable lacquer, which would avoid this defect, is now available. Some of the curers expressed the view that in commercial practice rectangular or square, rather than circular, tins should be used to economise in stowage space.

Throughout the experiment the results of the chemical and bacteriological tests confirmed those of the organoleptic or sensory examinations. Thus, little difference was apparent between the "gibbed" and the "nobbed" lots, whereas all samples of the "round" fish showed greater decomposition, particularly in the chemical tests.

Conclusions

Contact with wood, as such, does not, as far as this experiment goes, appear to be necessary to obtain a proper cure. The choice of alternative materials for vats, containers, etc., large or small, would require, however, to be carefully made. For vats or tanks it is suggested that some sort of concrete might be suitable. For small marketing containers, a suitably lacquered tinplate would, as the experiment has indicated, be satisfactory. Somewhat more care would no doubt be required in using metal containers to avoid exposure to warm conditions in view of the higher conductivity of metal. The whole question, however, of devising small containers for the finished product of suitable size, shape, and material calls for separate, special investigation.

With regard to the curing process itself, it is clear that "round" herrings, as has indeed been long recognised, will not in general accord a high-grade cure. On the other hand, herrings "nobbed" by machine should, to judge from the experimental results, yield as good a cure as herrings "gibbed" in the traditional manner. Herrings "gibbed" by machine were not examined, but there is no reason to suppose that they would not result in an equally satisfactory product. Moreover, the conclusion appears to be fully justified that for the "filling" of "full" types of herring employed, curing and storing in vats followed by packing into small containers for marketing yields as satisfactory a final cured product as the traditional packing in barrels.

Taking all these results into account, along with the promising development of machines for "gibbing" and "nobbing," it would seem that the stage

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Vegetable Oils

One of the primary causes of the shortage of oils and fats in European countries generally at the present time is the big reduction in the supplies of vegetable oils and oilseeds, which before the war accounted, in terms of oil, for about three-quarters of the oils and fats of all kinds—animal, marine, and vegetable—entering international trade. Statistics of production and trade, just published by the Commonwealth Economic Committee in its review,* show that, although world production has suffered a relatively small decline, and there has been some recovery in trade, particularly noticeable in the case of the Philippine Islands, total world exports in 1946, at under 1·9 million tons in terms of oil, were less than half those in the pre-war years, and in 1947 not more than two-thirds. The mai reason for this has been the reduced output and dislocation of the trade of the important pre-war exporting countries in the Far East which were occupied by the Japanese, but another significant factor has been the development of oilseed crushing industries in other major exporting countries, notably in India and in Argentina, and the retention of supplies by these countries to meet increased domestic requirements.

Commonwealth Production and Trade

The Commonwealth is an important producer of all the principal oilseeds except the soya bean and sunflower seed, and in the years just before the war it provided about a quarter of the estimated total world production and one-third of total world exports. Production has been fairly well maintained since the beginning of the war, and the Commonwealth has fully retained its pre-war share. Exports from Commonwealth sources became increasingly important during the war, and in some years accounted for more than half the world totals. The restriction of exports from India and the relatively slow recovery in Malaya have, however, had a serious effect on the Commonwealth's share of the world trade since 1945, and exports from the Commonwealth in 1946 and 1947 represented only about 30 per cent. of the totals. In both years Nigeria was by far the most important source of supply. The East African Groundnut Scheme, now in its early stages, is likely to result in greatly expanded exports from East Africa, hitherto a relatively unimportant source, and schemes for increasing production in other areas are being considered.

Before the war the Commonwealth was, on balance, a large exporter of groundnuts, palm kernels, and copra, and an importer of cottonseed, linseed, and soya beans. Since that time the position has altered considerably. The Commonwealth has remained a net exporter of copra, but in most years it has been a net importer of groundnuts and palm kernels, and also of palm oil. Owing to the limited supplies available, the import balance for soya beans has been small. The adverse balance for linseed has varied considerably from year to year, but on the average has shown little change. As the result of the almost complete cessation of cottonseed exports from Egypt and other foreign countries, the Commonwealth has become a net exporter of cottonseed. Before the war none of the Commonwealth countries, other than the United Kingdom, imported either vegetable oils or oilseeds to any considerable extent, but during the war Canada supplemented its own greatly increased production by importing fairly substantial quantities, and the supplies obtained by both Australia and South Africa were comparatively heavy.

Imports into the United Kingdom rose sharply in the early war years, and in 1943 reached a record total, in terms of oil, of over 880,000 tons, an increase compared with the average for 1934-1938 of more than 50 per cent. Since the war imports have been considerably reduced, but they have remained slightly above the pre-war level. Increased imports of palm oil, palm kernels, and groundnuts accounted for the marked expansion in total supplies during the war.

In addition to statistics of production and trade relating to all the principal oilseeds in each of the years since 1937, the review contains detailed figures showing the annual supplies of vegetable oils in both the United Kingdom and in the United States, and the quantities of each of these and other oils used in the manufacture of soap, margarine, and compound lard (shortening). There is also a section relating to the production and imports of whale oil.

* *Vegetable Oils and Oilseeds.* A summary of figures of production, trade, and consumption relating to groundnuts, cottonseed, linseed, soya beans, coconut and oil palm products, olive oil, and other oilseeds and oils. Commonwealth Economic Committee. Pp. 108+xv. London. Price 5s. net.

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is wellnigh set for the establishment of the salt curing of herrings upon modern food factory lines.

Mechanisation and tank curing would reduce the demand for highly skilled labour to a minimum, probably with a saving in time. Working conditions could be made more attractive and processes put under closer hygienic control.

Finally, the carefully selected and graded cures of high quality in both flavour and appearance, put up in attractive packs of the desired size, might well, at a competitive price, help to regain lost markets and to command new ones.

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The work described in this paper was carried out as part of the programme of the Food Investigation Organisation of the Department of Scientific and Industrial Research.

Sultana grapes being harvested in the Murray Valley.

Australian Dried Fruits Industry

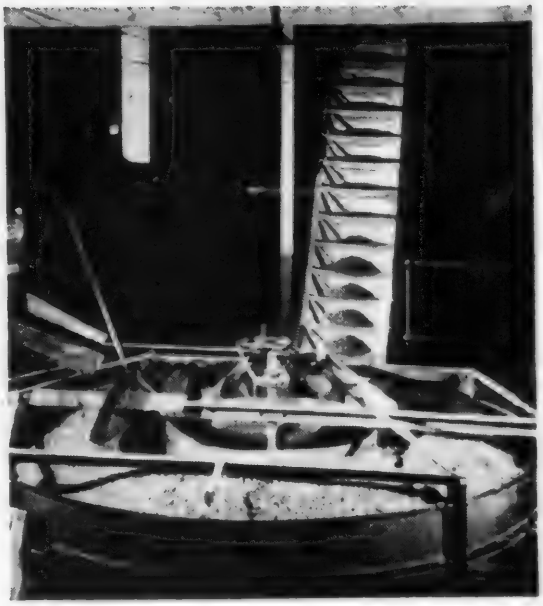
G. MARTIN

The success of the Australian dried fruits industry rests entirely on the formation, at the end of last century, of co-operative packing, processing, and marketing organisations. The largest centre of co-operative effort among Australian primary producers is in the Murray Valley, in the north-west of Victoria, where large irrigation schemes have turned thousands of otherwise barren acres into large rich vineyards and orchards.

THE growers of the rich Murray Valley own their own land, but they co-operatively regulate their planting; they work together on the harvesting, processing, and packing of their fruit; they pool special knowledge of their profession; their goods are marketed at home and abroad by a co-operative organisation, the Australian Dried Fruits Association. And when the season is over, the harvest sold, and the cheque in payment received, the good folk of Renmark enjoy their mild celebration at the co-operatively owned and run Renmark Hotel, whose profits support schools and hospitals of the district.

Growers are, in short, completely co-operatively minded, and subscribe fully to the statement, made in the Eighteenth Annual Report of the Dried Fruits Board of South Australia, that "the dried fruits industry has its roots and origin in co-operative enterprise, and its present efficiency rests on co-operative action alike in cultural practices, packing, processing methods, and in the marketing of the products. The solution of the problem, therefore, is entirely

After dipping in a soda solution to accelerate drying, the grapes are spread on long racks of wire netting.



Left: Sultanas drying in the sun.

Above: Sultana raisins passing from the conveyor belt to the mixing machine.

in the hands of the producers themselves, the greater majority of whom are shareholders both in their packing and marketing organisations and in their co-operative wineries and distilleries.

Founder of the Movement

Father of the co-operative movement in Mildura was the Canadian W. B. Chaffey, "the man who stayed," when the failure of the firm of Chaffey Brothers, Limited, sent one partner, George Chaffey, a broken man, back to the United States with his son Andrew. Working in his own vineyard, W. B. Chaffey quietly spread the idea of co-operation among his neighbours. He told the settlers in Mildura that if they were to receive fair value for their fruits, selling must be organised, and both Australian needs and world prices must be taken into account. They must sell at home what the home market needed, and export the residue. Thus each year's harvest would be sold to everyone's benefit under the best possible terms, and they would intelligently control their own affairs.

So, in 1896, was formed the co-operative which later was known as the Mildura Fruitgrowers' Association. The founders, including Mr. Chaffey, travelled to Renmark, the centre of the dried fruits industry in South Australia, and a similar organisation was founded there. Eventually this Association was to unite growers of the four southern states into the wealthy and powerful Australian

Grading the fruit in the packing house.

Dried Fruits Association, which was to market their goods throughout the British Commonwealth.

The first result of the amalgamation of growers was a marked improvement in the quality of the fruit. The Association aimed at uniformity within each grade of fruit, and continually sought to add another "crown" to the number which classified their fruit. Crude little packing sheds scattered through the districts soon replaced the makeshift packing arrangements set up previously in the growers' own kitchens. Registered packers were responsible for quality. The dried fruits industry entered on its machine age.

Mildura's first machine was an 8 ton double-decker, with the stemmer on top of the grader, and an elevator between them. It was tended by a lad who fed in the bunches of fruit by means of a small fork. In five years a 40 ton machine, tended by four men, was installed. Inside ten years Mildura Fruitgrowers' Association had an all-steel Brockhouse processing machine, treating fruit from stemming to boxing.

Assistance from the Greeks

In the early days, the quality of the fruit put up by the co-operative sheds was admittedly not of the high quality found in fruit from the Middle East. Australian raisins were classified as "pudding raisins," which worried the growers greatly. However, they could see no way out of using the "hot dip" method which darkened the fruit.

But chance, in 1922, put the secret of first-class fruit into the hands of the Renmark growers. A number of Greeks, refugees from Smyrna, had made their way to the vineyards of the Murray River Valley, feeling that in such surroundings their homesickness might be assuaged. They worked as labourers, and with their eyes on the processing methods of the growers, noted their mistakes. Finally, a spokesman approached the co-operative and offered, in return for land and enough money to buy vines and equipment, to teach the growers the processing methods which produced the golden, 5 crown sultanas of Smyrna. The Australian Dried Fruits Association agreed to the proposition, provided land and facilities for the Greeks, who in return, and without reserve, revealed the precious secret of the "cold dip" methods. The secret was made available to all growers; it is worth pointing out that there has never, in the history of the ADFA, been any attempt on the part of any grower to elicit knowledge and to capitalise it to his own gain. The knowledge of each is for the good of all.

TO AUTHORS

FOOD MANUFACTURE is prepared to consider the publication of any books on scientific and technical subjects which authors might care to submit.

Nitrogen and its Effect on Crops

THE American tradition of research station bulletins on specific subjects has never been sufficiently imitated in this country. The diverse and all too often abbreviated contents of annual reports are not nearly as effective in "putting over" the practical contributions that research can make. Is it a comment upon the virtues of private and national enterprise that a private research station, Jealott's Hill, should take the lead in Britain in this matter of bulletins? Certainly their sixth post-war bulletin, *Nitrogen for Cereals*, is a notable and well-timed publication. Like others in the same series, it is beautifully produced—indeed, superior in presentation to any American bulletin.

All the reputable results of applying nitrogenous fertilisers to major cereal crops are discussed, but the author, D. J. Halliday, has skilfully kept within the understanding of any reasonably well-informed farmer. Certainly the bulletin will be of enormous value to modern technically minded farmers and to the future farmers of Young Farmers' Clubs. Though the subject is one in which the Jealott's Hill Station is specially interested, the discussion is not in any respect confined to Jealott's Hill results; indeed, some of the most significant nitrogen effects reported have come from elsewhere. The fact that the industrial company which finances this research station is considerably interested in nitrogen fertilisers has not distorted the bulletin. It is proved beyond any scepticism that cereals should be given 2 cwt. of sulphate of ammonia per acre (or the equivalent of this dressing in other nitrogen forms) if optimum yields are to be obtained. The national average is still well below 1 cwt. Indeed, very strong evidence is given to show that the second hundredweight is nearly always a little more effective than the first. The dairy farmer cannot afford to ignore this possibility. The extra crop he can expect from the fuller use of fertilisers may make all the difference in his winter-feeding programme; even in a year like this, when harvesting crops is a severe and wasteful task, maximum yields mean more protein for cattle, even though the percentage of weather damage may be high.

Cereal needs for other fertilisers, especially the major nutrients, phosphates and potash, are not quite as fully discussed as one might have wished. Nitrogen must be accompanied with balanced amounts of these other nutrients according to the individual characteristics of the soils; for the farmer-reader this might have been emphasised more forcefully, though agricultural scientists reading the bulletin will take the point for granted. Nevertheless, nitrogen is the principal need in cereal nutrition; without enough of it no crop can prosper. What the bulletin does is to give us—and with an abundance of evidence—a new standard for defining "enough."—D. P. H.

Laboratory Layout and Construction

At a symposium on "Laboratory Layout and Construction" organised by the London and South-Eastern Counties Section of the Royal Institute of Chemistry, Dr. J. G. A. Griffiths said that the meeting had been arranged because chemistry formed a vital part of the national life. In order that chemists might play their part efficiently, it was important that each laboratory should be carefully planned and the layout suited to the type of work undertaken.

Laboratory Fittings and Fixtures

MR. C. L. PRIOR reviewed the services required in a laboratory, and stressed the importance of the accessibility of all service lines, the correct pressure of water mains, and proper fume chamber design. He also discussed laboratory furniture and the need for properly constructed anti-vibration tables for balances and similar equipment. Teak still appeared to be the best ordinary material for benches, although plastic, tile, steel, and other materials had been considered.

Teaching Laboratories

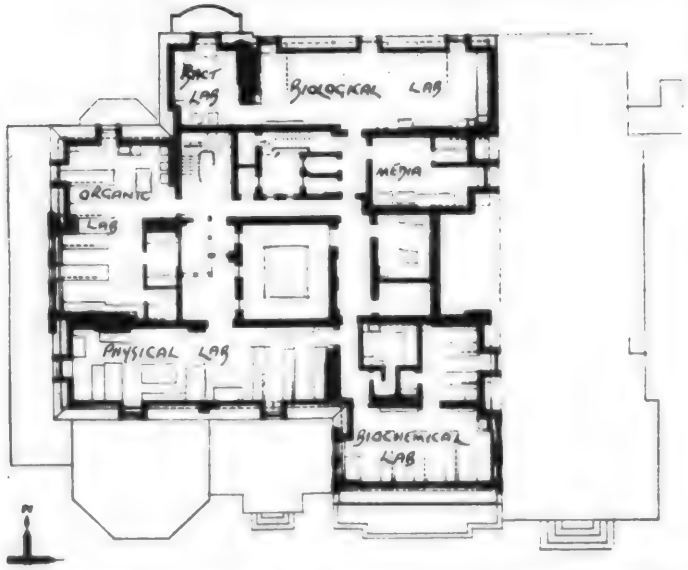
Academic and teaching laboratories were dealt with by Professor W. H. Linnell. In planning new laboratories, a single-storey building was ideal since drainage problems were thereby reduced to a minimum. In the design of benches, superstructure should be reduced as far as possible. Retort stands could be largely dispensed with if metal collars, suitably drilled and tapped, were set flush in the bench top at regular intervals. Vertical rods could then be screwed in when required. Pipeline vacuum systems were generally suitable only for filtration. For distillation purposes an individual trolley carrying a high vacuum pump, or a less powerful "chemical pump," should be provided. The trolley system could also be used to carry a communal apparatus such as hydrogenation kit or even a glass-blowing unit.

Referring to lighting, Professor Linnell said that while certain titration operations required the fluorescent "white" light, this might be trying to work with continually, and there was scope for the development of a system whereby the three primary colours could be blended in any desired proportion for any particular operation.

Analytical Laboratories

The main part of Mr. J. Haslam's talk dealt with the layout of the research analytical department of a large industrial company. He directed attention to the work carried out by such a department, to the most suitable site, to office, filing and recording sections, to the main analytical laboratory or laboratories, and to subsidiary laboratories dealing with micro-analysis, standardisation, physical methods, toxic elements, physical testing, metal-

The Beecham research laboratory.
Photo courtesy Swarbrick Studios.



lurgical analysis, fuel and gas analysis, lubricants analysis, and spectrographic analysis.

A modern main analytical laboratory was described in detail, paying particular attention to the amount of space per man, to the arrangement of fixed apparatus, to fume chamber and hot plate accommodation, to the floor, roof, benches, and arrangement of service pipes.

Lighting, vibration-free balance tables, and the housing of modern balances were described as well as the layout of standardisation and physical methods laboratories. Finally, the precautions to be taken in the arrangement of a laboratory for the determination of a toxic element such as lead in a large number of samples were described.

Research Laboratories

Dealing with research laboratories, Dr. F. H. Milner said that most well-established laboratories of any size were housed in buildings specially designed for the particular needs of the work to be done. He agreed that this was the ideal procedure, but in view of the difficulties of achieving this at the present time, spoke of the case where a large house had to be adapted for the purpose. It was necessary to expand the Beecham Research Laboratories, and in 1946 a Committee (four chemists, one engineer, and the Company Secretary) estimated the size of the building required. The final choice was made bearing the cost of adaptation in mind. The house and additional outbuildings provide about 28,000 square feet of floor space.

Domestic floors being, in general, unsuitable for carrying laboratory services, the double walls on the top floor of Brockham Park are ideal for establishing ring-mains above floor level. Lighting is by means of twin fluorescent units, which are out of phase to eliminate stroboscopic effect. Average illumination at working level is 10 foot candles. The warm type is used, except for titration benches, where daylight type is installed. Laboratory heating is by a boiler feeding a ring-main to ceiling units fitted with fans which provide cooling in the summer. Office heating is by radiators. The colour scheme is cream and biscuit. Minimum distances between benches is 3ft. 6in. and gangways are 4 ft. wide. In the absence of rubber, ¼ in. cork tiles had to be used for flooring. All benches abut outside walls which carry the services, including compressed air, vacuum, water, gas, electricity, and drains. Pumps for vacuum and compressed air are in the basement; high-vacuum pumps are on trolleys. Benches are free from superstructure; services are carried between the true and false back. They have black "Paxolin" tops 2 ft. 3 in. wide. Dr. Milner described specially fabricated equipment, including an enclosable microscope bench, balance tables comprising a concrete slab supported on 2 in. of compressed rope on brick piers. Animal cages are kept on racks suspended from the ceiling and clear of a dished floor. There is a separate solvent and strong acid store.

Microbiological Laboratories

The possible scope of activity of a microbiological laboratory covers a wide range from control of sterile medicinal products to fermentation, antibiotics, and various aspects of chemotherapy. Laboratories for any type of such work can be divided into four groups:

(1) Service laboratories, for the supply of media, apparatus, etc., and including balance rooms, biochemical control, etc.
(2) The principal laboratories where the main microbiological work is carried out.
(3) Special rooms, including animal rooms, incubators, cold store, sterile rooms, etc.
(4) Offices, cloakrooms, etc.

The principal essentials of design should include lightness, freedom from dust and dirt, and ease of cleaning.

Ventilation by means of conditioned air is recommended, and in certain of the laboratories, *i.e.* sterile rooms and incubators, special precautions are necessary to ensure the sterility of the incoming air.

In animal rooms, dealing with dangerous pathogenic organisms, very special care is needed to protect the staff from infection and to ensure freedom of the extracted air from such pathogens.

Cost Accounting in the Food Industry

Part V

HARRY DUGDALE, A.L.A.A., A.C.W.A.

Thus far in the present series, the basic elements of cost accounting operated on the so-called "actual" cost basis have been discussed. In so doing, mention has been made of the more advanced techniques known as Standard Costs and Budgeting Control, but these have not yet been described. In this article the function of Budgeting Control in the modern accounting set-up is outlined.

THE installation of a budgeting system calls for careful thought on the part of the Budget Officer, this official usually being the Chief Accountant or the Cost Accountant. Embraced in a Master Budget are various subsidiary budgets, and it is important to remember—in this scheme of expense control—that the amounts budgeted can (and should) be so grouped as to disclose functional responsibility. Thus, the Sales Budget is the responsibility of the Sales Manager; the Production Budget the joint responsibility of Production executives; the Service Budget the responsibility of the Plant Engineer, and so on.

Initiation of the Scheme

Normally, a start toward successful budgeting is made by a Board decision that budgets shall be introduced and operated in the Company. The Budget Officer is named and/or appointed; the various functional executives are formed into a Budget Committee; the objects and methods of the scheme are fully explained to that Committee; and work then commences on the initiation of the scheme.

If we are properly to control expense, we must initially have some sound notions of

(*a*) What "lines" are to be sold.
(*b*) What quantities of each "line" are to be sold.
(*c*) What production requirements will be called for to meet the sales programme.
(*d*) What the cost and financial picture is when related to the foregoing.

A start will be made by the drawing-up of a Sales Budget. Now this is usually the job of the Sales Manager, but he must have the fullest possible statistical data if his budget is to express realities. The point which it is desired to make is that a Sales Budget unsupported by past data is anybody's guess! The Sales Manager should have in his possession, if he is to forecast sales with any degree of accuracy, such trend statistics as the following:

1. The analysed sales of the company, over the past five years, according to product classification.
2. The sales analysed according to geographical areas, showing the products sold in each of such areas.
3. The latest census distribution figures, which should be related to the amounts of sales analysed geographically.
4. Summaries of trade expectancies prepared from the "field" reports of his selling staff.
5. The quantitative amounts of each "line" sold.

From the foregoing a reasonable approach can be made to the problem. Thus, if £ of sales per head of population vary in different areas, some thought must be given to the possibility of sales extension in the "under-sold" areas. This factor is germane, however, only in those cases where the raw materials, from which the products are made, are in unrestricted supply—a state of affairs not operating at present in many branches of the food industry.

Production of Sales Budget

A reasonable estimate will result from the careful assessment of trends, and the Sales Manager will then produce his Sales Budget, showing (*a*) the quantities of each size of each "line"; (*b*) where he expects to sell them; (*c*) the price at which he considers the sales should be effected (bearing in mind government regulation as to maximum prices), although—in this matter—price fixing should be the considered policy of the whole body of the Company's Directors, and not merely the opinion of the Sales Manager.

The Sales Budget is, therefore, the keystone of the arch of budgetary control. Once it has been formulated, discussed, amended where necessary, and finally approved by the Board, the next step can be taken, which is the preparation of the Production Budget.

A Production Budget is built up from a knowledge of such basic facts as:

1. The expected quantities of finished goods and of work in progress at the commencement of the financial year.
2. Similar information with regard to the end of the financial year.
3. The quantitative sales as detailed in the sales budget.

At this stage of the budget installation, it is highly important that the Production Executives study the year's production requirements. For example, is the production achievable with (*a*) the present plant equipment, and (*b*) the present labour complement? Does the inter-relationship of processing times indicate that the postulated production will be one which would give rise to impediments in production flow? Will overtime be required? If the production is greatly in excess of single-shift capacity, how many shifts per week will be needed? And so on. It will be realised, at this point, that the practicability of the Production Budget is directly influenced by the soundness of the Sales Budget. And if the latter has not been based on the lines laid down earlier herein, *i.e* if trends over several years have not been studied and delimiting factors have not been appreciated, then it is possible that the Sales Budget will have to be scaled down into line with production possibilities.

The Production Budget will be thus hammered into shape, and the quantities to be produced ascertained.

Estimation of Requirements

From this point it is possible to estimate with reasonable accuracy the following requirements:

(*a*) Labour complement.
(*b*) Materials required.
(*c*) Service facilities, *e.g.* plant and building maintenance, power and steam production.

These estimates will be more valid if supported by a costing system. The latter will show the cost of products under the several headings of Labour (Direct), Materials (Direct), Overhead Charges, Administration Charges, and Selling and Distribution Expenses. Hence, a reasonable approach to an evaluated Production Budget can be made if projected production is expressed in terms of analysed constituent costs.

Departmental Details

The Production Budget will be "broken down" into a series of Departmental Production Budgets. These will show, *inter alia*:

(*a*) The labour complement of each department, analysed to Cost Centres; and, where several of such are comprised in the department, show the anticipated production in hours and units (or both) in each Cost Centre.
(*b*) The indirect labour required in each department.
(*c*) The direct expenses, per department, comprising cost of supervision, chargehands, consumable supplies, waiting time, scrap losses, etc.; where it is possible to earmark any of the foregoing to specific Cost Centres, then this should be done, as a means of affording maximum control of expenditures.

(*To be concluded*)

The British Association in Brighton

CHANGES in the world brought about or greatly influenced by the advance of science and technology during the last sixty years was the theme selected by Sir Henry Tizard in his Presidential Address to the 110th Annual Meeting of the British Association. He compared the material prosperity of this country sixty years ago with that of today. During those years the productivity of industry (and by the term "productivity" he meant the average amount of useful work that a man does in a year whatsoever the nature of that work) had declined relatively to that of other countries such as the United States, Switzerland, and Sweden. Unless we could raise our standard of technology, unless there were many more men in executive positions in industry whose practical experience had been preceded by a scientific education, we should inevitably fail to keep our place among the great manufacturing nations.

He wished people to be clear about what results might be expected to come from the application of science to industry. The object was to do something that had never been done before, or to do things better than they had been done before, and it had, or should have, the special object of reducing the labour required to supply the material needs and wants of men.

In this country, which depended more than any other on international trade and which could continue to maintain its present population only by exchanging manufactured articles for food and raw materials, the productivity of labour was of primary importance, for unless this was as high as, or higher than, in other manufacturing countries, we should not be able to compete in the markets of the world, and the productivity of labour in Great Britain was far lower than it could be if the results of past research were more resolutely and continuously applied. Only by maintaining leadership in the application of science could we hope to keep our position among the great nations; and it was not surprising that the United States and Canada, for example, with their great natural resources and abundant supply of cheap power, should have passed us in wealth and productivity before the war, but it was by no means so easy to explain why Switzerland should have equalled us in prosperity by 1939, or why the industrial productivity of Sweden, a country that has no coal, should have been rising so much more rapidly than Great Britain's in the years between the wars.

Sir Henry quoted these examples because it was his view that it was not the general expansion of research in this country that was of first importance for the restoration of its industrial health, and certainly not the expansion of Government research remote from the everyday problems of industry. What was of first importance was to apply what was already known.

A New Growth-promoting Substance?

AT the 1947 Congress of Pure and Applied Chemistry Professor Jansen of Holland showed that summer butter contains a trace nutrient of growth-promoting influence additional to that of the known vitamins. Fortified margarine in tests conducted over several years could not achieve similar results with summer butter. Furthermore, this growth-promoting substance had been concentrated by fractional distillation *in vacuo* of fatty acid esters from summer butter. In the same stream of progress, but on the other side of the Atlantic, research workers of the U.S. Bureau of Dairy Industry at Beltsville claim that there is an unidentified nutrient "of vitamin kind" in milk, liver extracts, egg yolk, and grasses. Here, too, a number of years have been spent in patient investigation. The nutrient which the U.S. workers claim to have recognised cannot be found in cereals or cereal flours, in yeast, or in egg albumen; and they argue that cattle must acquire it from grass and roughage feeds.

Research at Beltsville

In the Beltsville work rats were grouped and fed as follows:

Group 1.—On a basic ration containing all known nutrients, a ration commonly used in biological assay for vitamin A but with adequate vitamin A added.

Groups 2, 3, and 4.—On a similar ration but with the pure carbohydrate replaced by 45·5 per cent. of white flour, enriched white flour, and wholemeal flour respectively.

Groups 5 and 6.—On the same rations as 3 and 4 but with 10 per cent. of dried skim milk incorporated.

All these feeds supplied a sufficiency of all known nutrients for optimum development. Rats in Groups 1 to 4 grew at much the same rates, but this was only a little more than half the rate of growth of their sex-litter mates in Groups 5 and 6.

It was thought that the dried skim milk may have added to the palatability of the ration and thus induced better nutrition for a relatively simple reason. In experiments to check this possibility, it was found, however, that an addition of liver extract to the diet had the same effect as the dried skim milk even when the liver extract was fed separately; indeed, injection of the liver extract under the skin gave the same enhanced growth rates. Over 400 pairs of litter-mate rats were put through these tests. It was concluded, therefore, that the effect was not one of mere palatability but one that involved a genuine nutritional requirement.

The U.S. investigators turned to the various constituents of the basic ration. Group B vitamins had been supplied by yeast; various sources of yeast were tried but the rats did not fare better on the Groups 1 to 4 rations. Similar changes in the sources of the other known vitamins still failed to achieve the growth-rates of Groups 5 and 6. The "cross-examination" switched to the protein in the basic ration. This had been supplied by 5 per cent. of yeast and 20 per cent. of "biological assay" casein. Varying the sources of purified casein produced some improved growth rates, though in no case was the effect comparable with that of the dried skim milk. But when "commercial" grades of casein were used, and casein samples dialysed or centrifuged from milk, the full growth-rates of Groups 5 and 6 were obtained. It was indicated, therefore, that this unknown nutrient was naturally associated with milk casein, but tended to be removed wholly or partially in the successive alcohol treatments of "pure" casein preparation.

The possibility that the effect was due to supplying a necessary amino acid seems unlikely, for a concentrate made from the liver extract produced the full growth rate when given in doses of only 2 micrograms per rat, and it is usually considered that about 10,000 times this amount is needed as the minimum daily dose of any essential amino acid.

The Elusive Nutrient

Further work has shown that the new nutrient is heat stable. It is still active in dried skim milk after various heating tests and solutions containing it were active after steam pressure heating for three hours. So far only a limited number of foods have been examined, but the nutrient is not found in cereals, flours, brans or corn meals, oil seed meals, carrots or tomatoes; it is found in milk, skim milk, cheese, liver extracts, pork and beef muscle, lettuce, certain grasses, and hays. The development of young rats has been greatly improved by adding liver extract to the basic ration of the mother rats during the suckling period, or by adding the extract to the young rats' diet. In the latter case, where pairs of litter-mates have been compared on a "with and without" basis, female rats have often later either failed to produce a litter or have produced non-surviving litters.

There does not seem to be much possibility that a deficiency of one of the already known nutrients is involved in these American results. The basic ration used was adequate for vitamins A, D, E, K, and C; also for choline, thiamine, riboflavin, pyridoxin, panthothenic acid, nicotinic acid, para-aminobenzoic acid, inositol, biotin, folic acid, and xanthopterin. Yet the addition of this other trace-substance could almost double the growth rate. Will Beltsville or Amsterdam isolate a new growth-promoting substance first? And will it prove to be the same substance when both investigations reach this stage of finality?

News from the Industry

FORTHCOMING EVENTS

Plant Engineers Meetings

The future programme of the London branch of the Incorporated Plant Engineers Institution includes a talk on "Maintenance as applied to Plastics Moulding: Part 3" by Mr. F. W. Parker, to be given on October 6 at the Royal Society of Arts. On October 1 the Birmingham branch are holding a discussion following four short talks by branch members at the Imperial Hotel.

An exploratory meeting is being held in Dundee with a view to forming a branch. Interested engineers should contact the honorary secretary of the Glasgow branch, Mr. A. G. Bell, M.Inst.F., 25, Wellington Street, Glasgow, C.2.

Royal Institute of Chemistry

The following meetings are included in the autumn programme of the London and South-Eastern Section of the Royal Institute of Chemistry:

Oct. 7. "Careers for Chemists." N. Booth, Ph.D., F.R.I.C. 6.30 p.m. at the South-East Essex Technical College.

Nov. 4. "Protein-Detergent Complexes and some of their Uses in Industry." K. G. A. Pankhurst, Ph.D., F.R.I.C. 6 p.m. at Brighton Technical College.

Society of Chemical Industry

The following completes the 1948 syllabus of the Food Group of the Society of Chemical Industry:

Oct. 7. Joint meeting with the Bristol Section.

Oct. 13. Microbiological and Nutrition Panels joint meeting. "The Role of Vitamins (and Metals) as Co-enzymes in Bacterial Metabolism." Dr. E. F. Gale.

Oct. 27. Nutrition Panel. "Nutrition and Prenatal Development." Prof. A. St. G. Huggett.

Nov. 1. Joint meeting with London Section. Symposium on Packaging. Papers will be read by Dr. G. L. Riddell, R. K. Sanders, C. R. Oswin, G. E. Forstner, and C. H. F. Fuller.

Nov. 16. Conversazione at United Dairies, Ltd., Laboratories, London, W.12.

Nov. 24. Microbiological Panel. "Spontaneous Combustion in Hay, Cotton, and other Vegetable Materials." Dr. J. B. Firth.

Dec. 1. Joint meeting with Society of Public Analysts and other analytical chemists. Discussion on Food Standards and Labelling.

Dec. 8. Nutrition Panel. (*a*) "Physiology of Intravenous Alimentation." Dr. H. E. Magee. (*b*) "Preparation of Materials for Intravenous Alimentation." Dr. G. M. Dyson and Dr. E. M. Bavin.

Dec. 9. Microbiological Panel joint meeting with the Nottingham Section. "Some Properties of Plant Viruses." F. C. Bawden.

Dec. 14. Joint meeting with the Agricultural Group and the London Section. "World Cereals Today." C. A. Loombe.

Royal Sanitary Institute

Meetings arranged by the Royal Sanitary Institute are as follows:

Pontypool Sessional Meeting. October 7, at 10 a.m., in the Ambulance Hall, St. James's, Pontypool. Papers on "Health and its New Aspects," by A. S. Jarman, M.B., B.S., and "Food Hygiene," by F. G. Meek, Chief Sanitary Inspector, Pontypool. Chairman: Sir Weldon Dalrymple-Champneys, Bt., D.M., F.R.C.P. (Member of Council).

London Sessional Meeting. October 13, at 2.30 p.m., at the Institute. Paper on "The Control of Milk Quality," by E. B. Anderson, M.Sc., F.R.I.C., Chief Chemist, and L. J. Meanwell, N.D.D., of United Dairies, Ltd.

Poole Sessional Meeting. October 22, at 10 a.m., in the Council Chamber, Municipal Buildings, Poole. Papers on "Food and Health," by Lord Llewellin, P.C., C.B.E., M.C., T.D.; "Food and Disease," by Dr. G. J. G. King, Director, Public Health Laboratory Service, Poole; and "The Chlorination of Sewage Effluents," by R. Leggat, Senior Sanitary Inspector, Poole. In the afternoon there will be visits to (*a*) British Drug Houses, Ltd., Chemical Works, Poole; (*b*) George Jennings' South-Western Potteries; and (*c*) Haven Point, Sandbanks, Branksome Chine, etc.

Benjamin Ward Richardson Lecture. November 10, at 2.30 p.m., at the Institute. "Science in the Imported Meat Industry," by E. H. Callow, B.Sc., Ph.D., F.R.I.C., and M. Ingram, M.A., Ph.D., of the Low Temperature Research Station.

Lectures on Malting

A course of seven lectures on malting will be given at the Sir John Cass Technical Institute, London, on Monday evenings at 5.30 p.m., beginning on October 18, 1948. The subjects and lecturers are:

Oct. 18. "Malting Barleys." H. Hunter, M.A., D.Sc. (Pure Seed Co., Ltd., Cambridge).

Oct. 25. "The Selection, Purchase, and Storage of Malting Barleys." Colonel E. P. Clarke, D.S.O., J.P. (E. C. Clarke and Son, Ltd.).

Nov. 1. "Barley Drying and Sweating." W. H. Cashmore (National Institute of Agricultural Engineering).

Nov. 8. "Floor Malting and Special Malts." Commander A. Cory-Wright, D.S.C. (H. A. and D. Taylor, Ltd.).

Nov. 15. "Pneumatic Malting." F. A. Reddish (Greene, King and Sons, Ltd.).

Nov. 22. "Air-conditioned Maltings." W. F. Ball (J. and E. Hall, Ltd.).

Nov. 29. "Barley and Malts Analyses and their Significance." Frank Marshall (Chief Chemist, H. A. and D. Taylor, Ltd.).

The arrangements have been made by Mr. W. T. Smith (Truman Hanbury and Buxton), acting on behalf of the Institute Consultative Committee for the Fermentation Industries. Each lecturer is a leading authority on his subject and the lectures will include accounts of recent advances in the theory and practice of malting.

The fee for the course is 20s. and application for an enrolment form should be made to the Principal of the Institute, Jewry Street, Aldgate, E.C.3, if possible before the opening date.

Appointments

Mr. S. Fildes has been appointed manager of the Newcastle-on-Tyne branch of Musgrave and Co., Ltd., in succession to Mr. W. J. Adams.

*

Mr. P. J. R. Tapp, C.B.E., M.C., chairman of the Meat Transport Organisation, Ltd., has been elected an ordinary member of the Council of the Institute of Transport.

Food Machinery Manufacturers

A list of members with their addresses and a classified index of their products is contained in a useful handbook recently issued by the British Food Machinery Manufacturers' Association, which is the trade association of firms engaged in the design, manufacture, and supply of food processing equipment. This handbook is an interim publication pending the issue of the first edition of the association's illustrated *British Food Machinery* which is in course of preparation.

Centenary Celebration

It is 500 years since the first British recipe for sausages was published, and "weasels," as they were called at one time, long remained a delicacy for the favoured few. They achieved their universal popularity through the enterprise of Thomas Wall, born in 1846 at 113, Jermyn Street, London, and a plaque in commemoration of him was unveiled there by Lord Carisbrooke on September 2. Various difficulties made it impossible to unveil the plaque on the centenary of Wall's birth as had been hoped, and the ceremony had to be postponed until this year.

Mr. Cecil W. Rodd, chairman of T. Wall and Son, Ltd., and Lord Carisbrooke at the unveiling ceremony.

Grandson of the Richard Wall who was appointed "Pork-in-Ordinary" to King William IV, Thomas Wall built up the family pork butcher's business into the well-known firm of T. Wall and Sons, Ltd., now one of the largest manufacturers of sausages and ice cream in Britain. Queen Victoria was one of his regular customers, and sausages mixed according to her own recipe were delivered every week from the Jermyn Street shop to Buckingham Palace.

Thomas Wall was also a pioneer in many aspects of social advancement; he undertook philanthropic works and was a champion of the Green Belt scheme.

Vitamin Research

An account of investigations carried out at the Ovaltine Research Laboratories is contained in their recently issued Annual Report for 1947. Further experiments in food for babies and the effect of the germination of seeds on their nutritive content have been made, while more work has been done on the subject of vitamin assays. Much valuable experience has been gained from collaborative studies on the estimation of vitamins and other nutrients in staple foods, to facilitate which standard samples of different foods have been produced. In addition to these investigations an interchange of information and of samples concerning a variety of problems has been made with numerous workers abroad.

Bombay Milk Scheme

Leading personalities of the British dairy industry and officials of related Government Departments were present at a dinner given by the A.P.V. Co., Ltd., on August 11 at the Savoy Hotel in honour of Mr. D. N. Khurody, Milk Commissioner to the City of Bombay.

Mr. Khurody is in this country on a short visit in connexion with the details of a scheme aimed at re-organising the whole structure of the production and distribution of milk in Bombay.

The first of two or three large milk-producing units is now under construction, and it is planned that some 8,000 gal. per day from each unit will be treated and then distributed from Government centres in the city itself. All existing cowsheds will eventually be moved out of the city on favourable terms to the present producers.

The Bombay Milk Supply Scheme, when complete, will, it is believed, mark an important step forward in the organisation of dairying under tropical conditions.

The A.P.V. Engineering Co., Ltd., Calcutta, the Indian subsidiary of the A.P.V. Co., Ltd., has been entrusted with the contract.

Unit Construction in the Factory

Constructed of mobile steel racks which are built in single units and run on roller bearings on rails, the storage equipment system designed by Fisher and Ludlow, Ltd., allows an efficient control of stock movement and greatly facilitates stock-taking. All ranks but the rear one are mobile and access to each rank is obtained by sliding the units along their rails. One empty space is left in each rank for this purpose, thus eliminating gangways.

Another example of storage equipment is a system built up from standard interchangeable units for the speeding up of handling on the production line and between the line and stores. The basic units are eight tiers high, single-sided, and constructed so as to allow back-to-back and side-to-side arrangement. When full, the boxes are fed straight from the line to the racks, their contents being visible from any angle.

Other types of unit construction systems include tables for light assembly work, partitions, and open steel flooring.

Conservator Cabinet

Constructed on a rigid base frame of mild steel angle, the Conservator cabinet is one of the many fabrications in sheet metal made by Humphris Metalcraft, Ltd., for the food and allied trades. Evaporator tubing is continuously soldered around the outside of the tinned or galvanised mild steel container, while insulation is provided by compressed cork board bitumen 3 in. thick, sealed both to the container and to the exterior shell. The lid, which is centrally hinged and of flip-flap pattern, can be lifted clear of the cabinet and is provided with a moulded rubber sealing edge. The lower compartment, in which is fitted a valve box for housing the automatic expansion valve, has front and back louvred panels and two mild steel straps are provided for the acceptance of the condensing unit.

New Package for Pre-cooked Meats

Especially designed for the pre-cooked meat industry, a new Goodyear package which prevents shrinkage in weight of the product, retains its original shape, colour, and texture, and precludes formation of mould, is now available in Britain.

The wrapping consists of a tube of transparent Pliofilm, heat-sealed along the seam, with open ends which are tied over the product with string. It conforms to the shape of whatever is wrapped in it, and its surface forms an excellent base for printed matter.

Sealing of Porous Castings

The sealing of castings that have been shown to be porous under pressure tests avoids loss of time and money, and a leaflet recently published by the Pulsometer Engineering Co., Ltd., illustrates the sealing of castings by the company's vacuum method of impregnation. This process has been successfully applied to bronze, gunmetal, steel, aluminium, and cast-iron castings of all sizes.

Carbon Collectors

Providing an efficient and economical means of current collection for cranes and trolley booms of industrial travelling equipment, the carbon collector manufactured by the Morgan Crucible Co., Ltd., eliminates the roughening and blistering of the wire and, in addition, polishes and preserves it by imparting a protective coating of carbon. For trolley boom collection, the carbon insert reduces collector dewirements, particularly round corners and curves, and eliminates the necessity for grease lubrication. It is easily replaced and saves the renewal of the complete shoe.

Biscuit Manufacturers' Plans

The transfer of the whole of their concern from Ipswich to Stowmarket, where they will take over part of the factory premises at present occupied by British Nylon Spinners, Ltd., is planned by R. M. Scott (Ipswich), Ltd., biscuit manufacturers.

Plans for the Stowmarket factory include the installation of modern equipment, with the latest types of machinery, and new mixing, packing, and wrapping machines will be included.

A scheme for garden surrounds to the factory is being drawn up, and there will be up-to-date canteens and rest rooms for the employees. The provision of a model grinding mill will enable the public to see the full process of biscuit-making, from the wheat to the finished product.

It is hoped to have the removal completed and biscuit production commenced by the beginning of next year, when an additional forty employees will be engaged.

Small Firms Wanted at Fair

At a conference held in Scotland recently, it was stated that the Scottish Trade Fair, which will be arranged on B.I.F. lines and will probably be the biggest event of the type ever attempted, will open in Glasgow on September 1, 1949. The Fair, which may be held in the Kelvin Hall, is aimed at stressing the expanded range of Scottish industry and encouraging both home and overseas markets to absorb more Scottish goods, as well as promoting good design and efficient production.

Despite the excellent initial response from Scottish firms, the sponsors want a great many more exhibitors, and participation, particularly by smaller firms, is welcomed.

Transfer Blocking Foils

Perfectly dry and ready for use immediately after application, the transfer blocking foils produced by Hill Bros. (Service), Ltd., are supplied in rolls or sheets in any colour.

The material, which is coated on paper, can be printed on cardboard, paper, metals, plastics, wood, leather, cloth, textile fabrics, acetate, celluloid, etc. The heated types or dies come into contact with the back of the foil, releasing the colour on to the article being marked.

Complete outfits and accessories can be supplied and free advice to users of the equipment is given.

New Quick Freezing Venture

It has been felt for many years that quick freezing and canning offer a prospect of continued prosperity for the fishing industry in Scotland and efforts have been made repeatedly to interest the authorities in such ventures. The registration of a new company, St. Clair Fisheries, Ltd., at Ullapool, to carry on business as freezers, quick freezers, preservers and manufacturers of food and fishery products, is therefore interesting in that it marks an individualistic effort to solve the problem of preservation of local fish products until they can be transported to profitable and open markets.

Paint Transfers

Made in five types, the transfers produced and patented by Trapinex, Ltd., are heat resistant and can be applied by unskilled labour at production line rates. There is no limit to the size of the design and the transfers do not deteriorate during storage.

The slide-off type is generally produced by a paint process; the design is printed on a solid base of paint which, when dipped in water, will permit the design to be slid off on to the object in question. The sandwich type is advantageous for fine detail and open designs. In the case of double-sided transfers, designs are printed on both sides of an opaque layer of paint so that when applied they can be viewed from either side. Normal transfers can also be stoved on various materials by use of a suitable stoving varnish.

New Ice Cream Regulations

In order to facilitate the application of the new regulations controlling the manufacture of ice cream, authorities in Glasgow are issuing forms to retailers and manufacturers which, when completed and returned, will be followed by an official visit of inspection. Inspectors will advise as to any improvements or alterations necessary to bring the premises and equipment into line with the new regulations, and a period of grace in which to effect the desired changes will be given. Failure to make application for registration has meant that the authorities have been forced to work on older lists of known manufacturers and retailers and it will probably be difficult to ensure that the new regulations come into force on November 1.

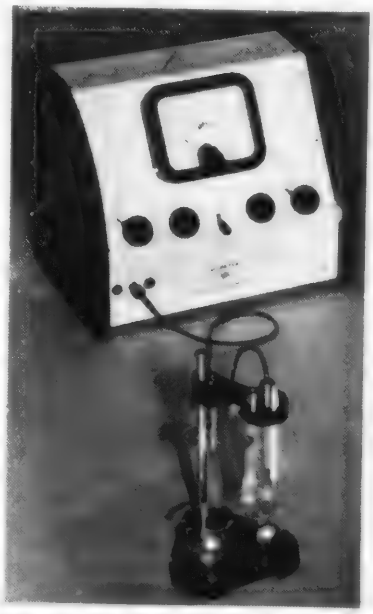
Data on the ice cream position in Glasgow, recently given by the City Analyst, showed that the term "ice cream" covered products ranging from 1 per cent. to 10 per cent. of fat, while the lower grades were in fact iced water rather than ice cream.

Tomato Purée Plant

Manufacturers of plant for making tomato purée in Italy would readily find a market.

Meters and Indicators

Incorporating a patent circuit, the new *p*H meter manufactured by Industrial and Scientific Instruments, Ltd., provides for high stability over prolonged working periods, an important point in routine work.



The new pH meter.

Other instruments manufactured by this company include a detergent strength meter of interest to all users of washing machinery. This instrument indicates the concentration of detergent solutions, eliminating the need for titration.

The company also produce a rapid abnormality indicator, a portable instrument for the detection of abnormal milk production.

Soft Drinks Industry Expansion

Citrus Products, Ltd., juice and soft drink producers, are to take possession of one of the factories on the new North Cardonald Industrial Estate, Glasgow, which will act as a subsidiary unit to the existing Hillington Estate. Factories at North Cardonald are nearly completed and occupation will be given in the near future. This development will expand the scope of the industry in Scotland and add to the volume of employment in this field.

Ball Labyrinth Steam Traps

The construction, function, fuel-saving properties and self-cleaning action, discharge capacity and maintenance of their ball labyrinth steam trap are described in a leaflet recently issued by the Hendon Precision Engineering Co., Ltd. The trap, made for low, medium, and high pressure, has no links, levers, or other movable parts, the wear of which would influence its continuous function.

Accompanying the leaflet is a chart showing the discharge capacity per hour at various steam pressures with instructions on how to select the correct trap.

Cockles from Wales

According to a report just issued by the South Wales Sea Fisheries District Committee, the Burry Estuary in Carmarthenshire now leads Britain in cockle output. Cockles gathered by the townspeople in the neighbourhood are being bottled and sold in various parts of the country; one local girl travels to Bath every Saturday morning with a consignment of cockles which she sells from door to door.

It is hoped to find an export market for this product, especially in America and other hard currency countries.

Herring Shoals Investigated

An investigation of the shoals of herring off the Dogger Bank and Yorkshire coast was carried out by the research vessel *Clupea* during the month of September. The *Clupea*, which is controlled jointly by the Fisheries Departments of England and Scotland, was manned by a team of English scientists and operated from Whitby.

Catches were examined for length, weight, age, sexual maturity, and fat content, in an effort to establish the identity of various populations of herring. Vertical movements of herring were studied by the use of an echo sounder, and trials made on the off-shore grounds to find out the best method of employing the sounder for drift-net fishing.

Further research work is to be carried out later this year to establish the effects of phytoplankton (weedy water) on the shoaling of herring.

The interior of Lipton's Shoreditch bacon factory.

Microbes and Dirt Kept from Walls

A preparation which imparts a hard, tile-like finish to which dust and germs cannot cling is produced by Glazebrooks, Ltd., for application to walls, woodwork, iron, and steelwork. It is unaffected by steam and condensation, resistant to abrasion, oils, acids, and alkalies, and can be repeatedly washed down without impairing its finish and durability. Conforming to the requirements of the Factory Act, it gives exemption from repainting of walls and ceilings for seven years.

Chemical and Milk Processing Lectures

A special course of lectures and practical work based on the syllabus of the examination for the Fellowship of the Royal Institute of Chemistry. (Branch E) which has been arranged by the Chelsea Polytechnic began on September 28. The course extends over two complete sessions and covers the subjects of food, drugs, water, bacteriology, toxicological analysis, and Acts and regulations relating to food, drugs, and poisons.

Courses of study for the examinations of the City and Guilds of London Institute in Milk Processing and Control were recommenced on September 27. The Intermediate course includes lecture demonstrations and practical experimental work bearing on milk processing and laboratory control, while the Final course covers the chemical and microbiological control of milk processing.

Bakers' Exhibition

An exhibition for the bakery and confectionery trades was held at the Horticultural Hall, Westminster, on September 1 and 2. Special attractions included a demonstration of "New Style Confectionery" which was given by the Unilever Bakery Service. Competitions were staged for a Silver Challenge Shield (England and Wales) and the corresponding trophy for Scottish bakers. To cater for the decorative side of the industry there was a competition for decorated cakes and, in addition, a Students Championship Cup was offered.

70,000 Lobsters to be Kept in Ponds

Aiming at creating a reserve of some 70,000 lobsters, the Crofter Supply Agency, Ltd., working through the Scottish Agricultural Organisation, is to buy live lobsters on behalf of the Government, store them in ponds, and regulate the supplies released for sale. The scheme will, it is believed, ensure that fishermen receive a higher proportion of the price eventually paid. They will have their lobsters marketed for them and receive a monthly cheque on the basis of a 2s. per lb. flat rate, plus a proportion of any profit the scheme may make. Boats, gear, and deficiencies in stock will be paid for by a sum set aside for the purpose.

Experts from the North American lobster areas have been called in to advise on methods of storage and marketing.

New Cereal Factory

The foundation stone of the new factory at Bromborough, Cheshire, was laid on August 25, by Mr. John Latham, who founded the firm of Latham and Co., Ltd., in 1884. After the ceremony the guests were conducted over the factory which is nearing completion, and were shown some of the latest machinery now being installed. A reception was held afterwards, when tribute was paid to the work and enterprise of Mr. Latham, now in his 89th year. The company expects their new factory to be in production by the beginning of 1949.

Institute of Meat

Founded in 1946 and under the patronage of Lord Horder, the Institute of Meat now has a membership of over 1,300 people drawn from every aspect of the meat industry.

In 1950 examinations for the Diploma of the National Federation of Meat Traders will be terminated and the examinations for the Ordinary and Higher Certificates of the Institute of Meat inaugurated.

Until then, trade members possessing the National Federation of Meat Traders' Diploma are eligible to apply for admittance to Associateship, without further examination.

Full membership may be granted when an Associate satisfies the Council that he has attained a suitable degree of responsibility in the industry. In certain special cases higher technical qualifications alone may be accepted.

It is probable that in the near future Associateship or membership will be restricted to those whose technical qualifications have been proved by examination. In the meantime experienced members of the trade, not already possessing technical qualifications by examination standard, may apply for admittance if their degree of responsibility in conducting a business or other essential organisation in the meat or allied industries indicates that the necessary competence has been acquired by active experience.

Forms of application can be obtained from the Secretary, The Institute of Meat, 5, Charterhouse Square, London, E.C.1.

Packaging in Export Trade

CONVERSION OF EXPORTERS NEEDED

Stressing the never-diminishing importance of export, Mr. S. L. Holmes, C.M.G., M.C., second Secretary of the Board of Trade, in his speech at the annual dinner of the Institute of Packaging held in London recently, said that the attractive packing of British goods was an important factor in the establishment of a continuing and expanding market. The end of the seller's market was approaching and our competitors had devoted much attention to packaging; but some British exporters had still to be convinced of the importance of packaging. Bad packaging could not be attributed solely to mushroom concerns out to make quick profits, and there was therefore a certain amount of conversion to be done. Sometimes bad packaging was attributable to bad material, and where there was a genuine lack the Board of Trade would do its best, within the limits imposed by scarcity, to assist any firm which could show its exports were suffering for this reason.

The chairman, Mr. G. M. Ashwell, gave a brief *résumé* of the progress made by the Institute since its foundation, and spoke of the support received in connexion with the proposal of a Packaging Exhibition, the first move in the organisation of which had already been made. He then dealt with the present state of packaging in this country and recalled the reaction to feelers put out by the Board of Trade in November, 1946, to ascertain the possibility of setting up a Packaging Advisory Service for industry. The reactions of the firms approached were disappointing and now, because of adverse criticism of export packing, a committee had been set up by the Federation of British Industries to deal with packaging matters.

Replying to toasts, Mr. Gordon Russell, C.B.E., M.C., director of the Council of Industrial Design, said that the Council had watched the growth of the Institute with great interest. He stressed the importance of the protective and visual factors of the pack and discussed the varied problems that enter into packaging.

New Groundnut Sheller

A prototype machine, for use in connexion with the African groundnuts scheme and designed to shell the nuts without damaging the kernels, was completed on August 31 by Colonel S. M. Cairns, director, and Mr. George Hayward, seeds machine specialist, of Robert Boby, Ltd.

Farman 330 KVA diesel alternator sets at Ransomes, Sims and Jefferies, Ltd.

A Prize Bacon-Pig

Mr. Collan E. Brett, manager of the Acton bacon factory of T. Wall and Sons, Ltd., won first prize for the best bacon-pig at High Wycombe Agricultural Show held on August 28.

The pig was a Large White, bred by Mr. Brett at his piggeries at Dells Farm, Stokenchurch, near High Wycombe. Mr. A. Stevens was the judge.

Extension to Glassworks

Large-scale re-organisation in the firm of Poplar Glassworks, Ltd., will be carried out in the near future, and big extensions to the existing premises are to be erected.

The present factory has been working full time during the past months producing a weekly total of 200,000 bottles.

Saving Electricity

A method of reconciling increased production with a reduction in the use of electricity is the installation of diesel-driven generating plant for factory power supply. Built on sturdy lines to enable continuous operation, the diesel engine will run on heavy, non-inflammable fuel oil which is easily stored. Many of the generating sets are arranged for electric starting, a method which is immediate and sure, even in cold weather, owing to the fact that the engine operates on the compression-ignition system and no carburettor is needed. The work of installation is simplified by the supply of self-contained power units, both engine and electrical equipment being mounted on a fabricated steel underbed equipped with foundation bolts which need only be grouted down into concrete flooring.

Cooling may be achieved by use of a mixing tank with temperature controlled by cold water from a cooling tower, or by a fan-cooled radiator integral with the engine and generator, and in many makes of diesel engine the lubrication system is entirely automatic, thus eliminating hand-oiling of working parts.

An interesting aspect of electrical generating by diesel power is the possibility of utilising waste heat from the engine for space heating or hot water supply.

Transport unit for the conveyance of liquid sugar.

Transport for Liquid Sugar

The main feature of the transport unit recently supplied by Messrs. Halls (Finchley), Ltd., for the conveyance of liquid sugar is the special 1,800 gal. elliptical tank which is divided into three compartments, each of 600 gal. capacity. In order to maintain a constant temperature, this tank is lagged with 2 in. thick Isoflex, covered with 20 gauge mild steel sheeting. A rotary pump controls the filling and emptying of the tank according to requirements. The trailer is equipped with quick action coupling.

Fruit by Air

Increasing enthusiasm is being shown in Scotland in the transportation of fruit by air, and recent experiments carried out have demonstrated its practicability for internal operation as well as for importing. The maintenance of high standards of quality achieved through faster movement, the absence of breakage as compared with normal transportation and the elimination of pilfering are the chief advantages of the method, while air transportation rates for loads of approximately 1 ton compare favourably with other means of transport. The latest stage in the development of the method is the appointment of reliable agents in the growing areas abroad who can guarantee the quality of the air cargoes.

Tenfold Increase in Packing Machine Output

The establishment of a new factory in addition to their Bromsgrove and London factories has enabled the Automatic Weighing and Packing Machine Co. to achieve a tenfold increase in capacity.

Short Weights

In his annual report, Mr. D. Thompson, Chief Inspector of Weights and Measures for West Suffolk, stated that a considerable amount of short weight is being detected.

Deficiencies found are usually in factory-packed goods, and precautions taken in some factories appear to be inadequate. Proceedings were instituted in nine instances, and thirty-two cautions were issued.

Importance of Standardisation

INCREASED CIRCULATION OF BRITISH STANDARDS

The importance of standardisation as a means of measuring the properties or assessing the value of goods in the proper conduct of industry and in the protection of public health and safety was stressed by the Rt. Hon. Lord McGowan, President of the British Standards Institution, at the annual general meeting held recently. It was also important, he said, as a means of establishing satisfactory ranges of types and sizes and where necessary securing interchangeability.

It was nearly twenty years ago that the Institution had extended its activities to cover the chemical industry, and the work carried out under the Chemical Divisional Council had proved to be of significance to many other branches of commerce.

Lord McGowan recalled that he had asked all Industry Standards Committees of the Institution to re-examine their standards from the point of view of exports. One of the best ways to avoid conflict with overseas national standards was for the local representatives of British firms to participate directly in their preparation. Many firms who were not formerly interested in export markets were now taking advantage of the Institution's offers of help, which included full information on the national standards of importing countries.

In conclusion, he urged everyone concerned with the guidance of industry to participate in the work of the organisation and to give it full support.

Presenting the annual report as Vice-President and Acting Chairman of the Institution, Sir William J. Larke outlined the progress being made in every department, and referred to the great extension in the circulation of British standards throughout the world. He also announced that an Advisory Committee on Electrical Appliances and Accessories had been set up with the collaboration of the British Electrical Development Association to investigate complaints regarding electrical appliances, while work between the Institution and the Inter-Services Committee on the unification of Anglo-American-Canadian screw threads was continuing.

Change of Address

The address of the London Section of the British Industries Fair has been changed to: British Industries Fair, Export Promotion Department, Board of Trade, Horseferry House, Thorney Street, London, S.W.1. Telephone: Victoria 6800.

Booklets Received

In the preparation of the new edition of their pocket book, Musgrave and Co., Ltd., have revised all the data previously given and have provided some additional information. The book contains data on gaseous, liquid and solid fuels, mathematical tables, notes on centrifugal and propeller fans, heat and drying, and numerous other items of information of value to engineers. The price is 11s. post free.

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Simplified by pictures and charts illustrating the salient points, *Britain's Food*, No. 8 in the series "Changing Britain" produced by Cadbury Brothers, Ltd., traces the story of our food through the ages and deals with the effect of foreign trade, industrial expansion and other diverse but inter-related causes on food habits and supplies.

▪

Trucks with fixed and lifting platforms from 1 ton to 4 tons capacity, tipping and tin-plate tiering trucks, crane trucks and electric tractors, as well as their latest production, the forklift truck, are detailed in a new edition of the catalogue issued by Ransomes, Sims and Jefferies, Ltd. The publication concludes with general remarks on battery charging, mileage per charge, and choice of equipment.

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A description of the engines manufactured by Ashworth and Parker, Ltd., together with drawings and illustrations and a list of users, are contained in a handbook produced by the firm. Distinctive features of the engines, which are designed for arduous service and prolonged running, include the extensive use of forgings in construction, the casting of cylinders on chills with subsequent finish by grinding, and accessibility of vital parts for adjustment and repairs.

▪

Vitamin Therapy—Its Uses and Limitations is the first of a series of booklets on this subject being issued by Vitamins, Ltd. The physiology, daily requirement, distribution and clinical uses of vitamins are given and the booklet concludes with a therapeutic index.

OBITER DICTA

● They do their best, no doubt, but it is a little hard on our stomachs.—*French Olympic athlete's comment on English food.*

● Buying ice cream on Sunday is contrary to the higher ideals of Christian life.—*Interview in the "Daily Express."*

● Now that sex has reared its ugly head in Government publicity, I suppose we shall have a "Be virile! Eat Snoek! campaign."—*Strix in "The Spectator."*

● It is a good many years since the people enjoyed a good sausage made of real pork, and the sooner they get back to a good pork sausage the better.—*Sir T. Dugdale, M.P.*

● My long-haired monkeys look better in the circus act if they are fed on dumplings. I should like to make a claim for extra flour coupons.—*A request from a circus equestrienne in Prague to the Ration Board.*

● When one looks at the tins of foodstuffs imported to bolster our rations, it makes one wonder why we cannot augment the allocation ourselves and so save money.—*Catherine Gordon in the "Evening News."*

● What is the good of a campaign for cleanliness in catering establishments while in so many of them queues of customers walk round coughing and wheezing over, and dropping cigarette ash on, food at cafeteria counters?—*A correspondent to "Réveillé."*

● When the retailers' champion waves his shining crusader's banner and cries the slogan, "Fair profit, fair prices, fair distribution!" after naively confessing that "the limit of extortion has long since been passed," even a simple (if cynical) consumer has to sit up and take notice.—*Correspondent to the "Glasgow Herald" on tomato prices.*

● The housewife was asked in a M.O.F. recipe to make a pastry containing 5 oz. flour and 1 oz. fat; proportions which would, one fancies, produce an almost cement-like mixture, while on the other hand consuming the fat ration of a whole week. The other ingredients of this recipe, delightfully named "Fish Envelope," were tomatoes and snoek.—*K. H. Mayne in "Time and Tide."*

No Cigarettes in Cafés?

The Caterers' Association of Great Britain is asking the British Tourist and Holidays Board to resist the proposal made to the Board of Trade by the National Union of Tobacco Workers that the sale of cigarettes and tobacco in small cafés should be stopped. It is pointed out that establishments of this kind are the canteens of the clerical worker, and the sale of cigarettes and tobacco is one of the normal amenities expected by their customers.

COMPANY NEWS

A payment of 7 per cent., less tax, is being paid on ordinary capital for the year ended May 31 by Johnson, Cole, Brier, and Cordrey, cold storage and ice merchants.

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An interim dividend of 5 per cent., less tax, on the ordinary capital is being paid by Marshalls' Food Products in respect of the year 1948. When the shares were introduced to the market in July, the directors of the company estimated that group profits for the current year would exceed £50,000, before taxation, and in this event they would recommend a dividend of 12½ per cent. on the ordinary shares.

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The turnover of the Lever Bros. and Unilever group for 1947 has shown a further sharp expansion compared with the previous year's total. With regard to operations in Western Europe, the volume of trade has shown an increase which has been more marked in those countries where shortages at the beginning of the period were greatest, and so long as the shortage of raw materials continues, the group will have a substantial surplus of production capacity. A further economic integration of the Western European countries would enable the group to make better use of this capacity and avoid having to increase it before the supply position for the whole of Western Europe makes it necessary.

Ordinary dividends are maintained at 10 per cent. in the case of Limited (the English company), and at 8·9 per cent. in the case of N.V. (the Dutch company).

News from Overseas

Albumen Concentrate from Fish

Norway is to send 50 tons of albumen concentrate to Palestine following the late Count Bernadotte's appeal. This concentrate, which is a new product extracted from fish, is produced by the firm A/S Marina, who also carried out the preliminary laboratory work. It has already been exported on trial to a number of countries, including Germany, and it also had a restricted sale in Norway during the German occupation.

Varying Butter Supplies

For some years back the supply of butter produced in South Africa was inadequate to meet the local demand. However, in January, 1948, ample supplies became available and the market was freely supplied with butter. Recently, however, supplies became scarce again and a form of rationing has had to be introduced. Distributors are now being given 75 per cent. of their previous allocation.

Although the manufacture of margarine was permitted recently it is being distributed only under Government control to certain groups of people and margarine is not available for general sale.

Ample supplies of cooking fat produced by the hydrogenation of whale and vegetable oils are available for consumers.

Refrigerated Transport

A self-contained refrigeration unit for food transport installation has been developed by the Kold-Hold Manufacturing Co., of U.S.A. It has hold-over plates filled with eutectic solution in the top section, and an electrically driven compressor in the lower part, which is powered by a 110 volt motor which can be plugged into any convenient power supply.

The hold-over plates can be fully charged in approximately eight hours, and refrigeration can be maintained for an equal length of time when transport is on the road.

South Africa's Sugar Production

It was estimated that the present sugar season in South Africa would yield 372,750 tons of sugar, which, together with a carryover of 63,387 tons from the previous season, would give a total supply of 636,137 tons.

The figures given would represent the highest production yet recorded but would in fact be barely sufficient for the Union's requirements.

During the past year the average sucrose content of the extracted juice was 13·32 per cent., which compares with an average in the previous six years of 13·78 per cent. The ratio of cane to sugar was 1 ton sugar to 8·87 tons cane.

The sugar experiment stat at Mount Edgecome is contin to do good work and a not success in field experiments h been the creation of a new vari number N.Co.310 and there h been a world-wide request for t remarkable cane.

Sugar supplies were also co ing from the United Kingdom t the Union, and this had given ri to a certain amount of comm locally that the imports were b ing made into South Africa at t expense of British consumers. I was pointed out, however, th the sugar sent to South Afric was refined in the United Kin dom from raw sugar obtaine from special sources and wa quite independent of the alloc tions for home requirements.

Surveying the Sea Bed

Part of a £250,000 fisheries re search programme launched b the state of North Carolina wil be devoted to investigations int the shrimp's habitat and mode o life.

Research will be conducted by means of an 85 foot schooner equipped with the latest instru ments now on loan to the Woods Hole Oceanographic Institute from the U.S. Navy, which will operate at sea for days at a time, on a continuous, three-shift basis.

Some £25,000 has been set aside for an oyster restoration programme, and of this sum nearly £4,000 will be expended in an effort to determine the proper place and technique for the planting of oysters.

Research does not terminate the survey, for the Department of Conservation and Development has acquired the U.S. Navy section base at Morehead City for conversion into a fisheries research and training centre.

Designed to teach American people to build, maintain, operate large boats, engage in fishing on a large scale, to understand the economics underlying the seafood business, and to prepare, package, and merchandise their products, the Morehead City Institute will enable its students to make a more efficient livelihood from the sea.

The auxiliary schooner "Reliance," which is equipped for marine research.

The hams are wrapped in grey ham paper prior to dipping in pitch.

Sealed Hams

A package for preserving bacon and hams consisting of an air-tight shell composed of layers of cotton stockinette, grey ham paper, and glassine, sealed by a continuous dip-coating of "pitch" and finished off with an unprinted Cellophane overwrap is being marketed by Swift and Co.

Packaging procedures for the hams and slab bacon are essentially similar. Hams, of the "skin on" variety, must be cooked prior to consumption, and range from 10 lb. to 14 lb. net. After curing and smoking they pass by overhead trolley to the packaging department. Each ham is placed in a cotton stockinette bag over which two layers of grey ham paper and one glassine wrap are applied, followed by a second stockinette. The covered ham is then dipped into vats of hot pitch of the same consistency as molasses at a temperature of approximately 370° F. The ham, suspended by a string, receives two dips on the shank and butt ends to build up extra thickness where damage by handling is most likely to occur. The rest of the product receives a single dip. During the dipping process the ham is momentarily submerged to enable trapped air to escape.

When dipping is completed in a series of vats, the hams drain and are suspended until the pitch hardens. Finally the Cellophane wrap is put over the product. The protective pitch coating averages about ⅛ in. thickness and will withstand exposure to fairly high temperatures without damage. Low temperatures make the coating somewhat brittle, but unless fractured the coating continues to provide protection.

Consumers are advised to remove the cover and hang in a dry place for 24 hours to 28 hours before cooking, which gives the product a chance to air out. The sealed jacket is easily removed by slitting the dip coating from one end to the other, when the ham can be withdrawn from the stockinette and layers of paper. To simplify unsealing a rip cord type of opening may be adopted later.

Food from Grass

A method for extracting important food elements from grass which, he believes, will provide millions of people with an excellent diet at a very low cost, has been perfected by Dr. C. F. Schnabel, according to whom a full day's ration can be produced for 16 cents (9d.).—*Reuter's Trade Services.*

The Story of Sugar

A brief history of sugar entitled *Sugar Down Through the Ages* is being distributed by Lamborn and Co., sugar brokers, of the U.S.A.

The story begins with the first mention of sugar cane in India eight centuries before the beginning of the Christian era, and traces its expansion down to the present time. It tells of the beginning of sugar processing, the origin of beet sugar, the impetus given to the beet sugar industry by Napoleon, the effect of wars and politics on both the cane and beet sugar industries, and other important highlights in various countries throughout the world.

The author of the history is Samuel Schoenfeld, statistician, in charge of the Statistical Department of the company.

Mechanisation of African Agriculture

MISSION TO STUDY PROBLEMS

Problems likely to be encountered in the mechanisation of African agriculture are to be studied by a mission which left this country by air for Uganda recently.

The leader of the mission, which will visit Tanganyika, Nyasaland, and Nigeria, in addition to Uganda, is Dr. J. R. Raeburn, of the Agricultural Economics Research Institute, Oxford, and he will be accompanied by Mr. J. W. Y. Higgs, lecturer in Agricultural Economics, Reading University, and Mr. R. K. Kerkham, Uganda Agricultural Service, who is at present stationed at the Uganda Agricultural Research Station.

The terms of reference are: "To make a systematic survey of the sociological, economic, agricultural, and technical problems which need to be studied if mechanisation of agriculture in the colonies is to develop along sound lines, including *inter alia* the forms or organisation required to achieve the best results (*e.g.* whether mechanisation should be on a co-operative, group, or peasant basis), the most profitable lines of future research into problems arising out of mechanisation, the economics of it and the types of tractors and implements which would be likely to be most suitable to the differing African communities, and such questions as the technical training of African craftsmen, the division and displacement of labour which will result from mechanisation and its impact on current farming and social systems."

Refrigeration in India

CONFERENCE'S RECOMMENDATIONS

Presided over by the Secretary, Ministry of Agriculture, Government of India, a Refrigeration Development Conference held in New Delhi on July 19 and 20 was attended by representatives of the trade, growers, and Provincial and State Governments.

In his inaugural speech, the Minister of Agriculture said that India lost about 3 million tons of food per annum through wastage and destruction by insects, fungi and rats, and the preservation of food by cold storage was, therefore, a very important question. Defining the objective of the Conference as being limited to the preservation of India's perishable foodstuffs, including potatoes, fresh vegetables, and fish, the Minister said that India possessed only sixty-five refrigeration plants and that the progress of development was handicapped by the non-availability of electric current in rural areas and the shortage of trained personnel.

The following decisions and recommendations were reached:

(*a*) The development of the industry should be left to private enterprise as far as possible.

(*b*) The establishment of a Central Refrigeration Research Institute.

(*c*) In connexion with refrigerated transport there should be cold storage at the place of origin, during transport, and at destination.

(*d*) A committee was appointed to advise the Government on all problems connected with the industry. This committee will consist of representatives from the Government of India in the Ministries of Agriculture, Industry and Supply, Works, Mines and Power, Commerce and Railways; three primary producers to be nominated by Provincial Governments; three representatives of the industry; one representative of cold storage owners; two representatives of States; three members to be nominated by the Central Government.

Groat Flour from Ireland

Made solely from Irish milled oats by W. P. and R. Odlum, Ltd., groat flour made its first appearance in Ireland in the Industries Section of the Royal Dublin Society's Horse Show held in August. The product is partly cooked before packing in 1 lb. tins, only the cream of the oats having been retained, and is claimed as ideal for porridge, biscuits, and children's food.

Precision Filling

An interesting mechanical device for the precision feeding into containers of quantities of liquid or pasty products such as cream, marmalade, mustard, and soap is reported from Paris. It consists of a device including a vice and screw which enables the driving pin of the plunger to be varied as desired. At each rotation of the mechanism a constant volume of the product is introduced into the containers without exercising the least pressure. Based on a new principle, the equipment does not include valves and works by an oscillating movement which covers and uncovers alternatively the admission and evacuation inlets.

South African Food Journal

The first number of the *South African Food Trades Journal* catering for the retail trade has been published in Cape Town. In addition to technical articles and a news service reporting the trends and developments of the South African food industry, the journal carries a digest of overseas information.

Cases of oranges being conveyed from the pre-cooling stores at Port Elizabeth docks prior to loading for export.

Giant Whale Factory Ship

Recently launched from a Copenhagen yard, the floating whale factory *Thorshövdi* of 23,500 tons deadweight has a cargo capacity of over a million cubic feet of whale oil.

The vessel, which attained on its trials a loaded speed of 12½ knots, is propelled by two two-stroke, six-cylinder diesel engines of Danish design and construction. It will join the Antarctic fleet in time for the next whaling season; outside the season it can be used as an ordinary oil tanker.

Butter in the Tropics

A new type of butter spread, containing dehydrated butter to which hydrogenated butterfat, salt, and skimmed milk powder have been added, is now being produced in Australia for marketing in tropical areas. Melting point for this product is 106° F. as compared with 80° F. for butter.

This new form of butter possesses a higher food value than ordinary butter, although it has the same appearance.

DDT and Shark Liver Oil in Ceylon

It is likely that the Ceylon Government will shortly investigate the possibilities of manufacturing DDT in Ceylon. Dr. S. N. Ganguly, the Ceylon Government Quinine Technologist, who has returned to the Island after a comprehensive tour of factories in the United Kingdom and on the Continent, said that he saw no reason why DDT could not be manufactured in Ceylon. He added, however, that there was a shortage of the requisite raw materials at present.

Referring to shark liver oil manufactured by the Department of Industries, Dr. Ganguly said that it was equal in standard to the cod liver oil manufactured by most European countries and that it was necessary that the rate of production should be increased.

Oil for Export

South African Railways are providing seventeen 5,000 gal. tank waggons to transport 1,000 tons of sunflower seed oil from Germiston to Durban for export.

Seal Flesh from Australia

Flesh of some of the seals being processed by a Melbourne firm may be canned and sent to Britain. The firm has begun processing the first batch of 2,000 seals, for the killing of which the Victorian Government has given its permission. Some flesh will be converted into poultry food.

Year-old Fresh Eggs

Discoveries in petroleum research applied to agriculture described in a report to the American Chemical Society presented by Dr. Gustav Egloff, director of research of the Universal Oil Products Co. and chairman of the Society's Petroleum Division, and Mary Alexander include methods of maintaining the freshness of eggs by the application of a plastic coating. Freshness is preserved in cold storage eggs much longer when they are subjected to a treatment which involves dipping the eggs in oil. Experiments indicate that even better results can be obtained from coating the eggs with a thin plastic film, eggs thus treated maintaining their freshness without any refrigeration for as long as one year.

British Wheat Pioneer Honoured

A new 2½d. (red) postage stamp issue of Australia, released on July 12 last, commemorates William James Farrer, who, by his pioneer research in wheat breeding, was responsible for the development of those varieties of cereal which resist disease and drought, and show a marked improvement in yield and quality of flour. The portrait for the stamp design was reproduced from a photograph of the late William James Farrer, which is hung in the Mitchell Library.

Farrer, who lived from 1845 to 1906, graduated as a surveyor at the University of Cambridge, and later applied himself to wheat breeding. He encountered many difficulties at first from people who refused to support his activities, regarding his theories as unpractical, but he carried on with his experiments, and eventually succeeded in the tedious task of selecting and improving the strains of wheat.

Eire Import Duty

Customs duty at the rate of 50 per cent. has been introduced in Eire on imports of malt extract and preparations of malt extract and fish liver oil.

Sugar Beet Congress

The Summer Congress of the International Institute of Sugar Beet Research, attended by many delegates from European countries, was held recently at the Albert Agricultural College, Glasnevin, Eire. After the reception, Dr. J. P. Dudok van Heel, of Holland, read a paper on the "Influence of the Climate on the Growth of Sugar Beet." This was followed by a short discussion in which Dr. J. Rasmussen, of Sweden, Vice-President of the Institute, said he thought there were greater variations in wheat than in sugar beet crops in the various European countries.

Members of the conference were then conducted on a tour of the beet fields and research departments by Dr. P. E. N. Clinch and Dr. O'Connell, of the Albert Agricultural College.

News from the Ministries

Change of Address

The headquarters of the Export Licensing Branch of the Board of Trade, formerly at Stafford House, King William Street, E.C.4, are now situated at Regis House, King William Street, London, E.C.4. Telephone: Avenue 3111.

Canned Mandarin Oranges

An amendment will be made to the Canned Fruit and Vegetables (Amendment No. 2) Order, 1947, No. 1317, adding maximum prices for 11 oz. tins of canned Mandarin oranges, limited quantities of which will be included in the forthcoming canned fruit release. The maximum prices will be as follows:

On a sale to a wholesaler, 9s. 9d. per dozen cans; by wholesale, 10s. 6d.; retail, per can, 1s.

Butter and Cheese from Australia

Agreement has now been reached in London between the Minister of Food and the Australian Government for the purchase by the United Kingdom of Australia's exportable surpluses of butter and cheese, covering production to June 30, 1955, less small yearly quantities for other markets which are to be agreed.

The prices for the 1948-1949 season will be 233s. 6d. sterling per cwt. f.o.b. for butter and 131s. 6d. sterling per cwt. f.o.b. for cheese.

As in the case of the New Zealand agreement which was recently negotiated, this new agreement provides for an annual review of prices, and allows for a maximum variation in any season of 7½ per cent. above or below the price for the preceding season.

The negotiations have been carried out in an atmosphere of the utmost goodwill and completed in the belief that the agreement will be of great mutual advantage to the United Kingdom and Australia.

Flour Restriction Scheme

Under the Flour Restriction Scheme, which has been in operation since July 18, deliveries of flour by first-hand distributors, *i.e.* millers, importers, and factors, are related to a datum based upon their deliveries during the twelve months ended June 26, 1948. Traders were originally informed that the datum would be applied in eight-weekly maximum quotas. It has now been decided that quota periods of sixteen weeks shall operate throughout the duration of the scheme.

Fruit and Vegetables from Sweden

Arrangements have been made by the Ministry of Food, in agreement with the Board of Trade, for the importation under specific licence during the 1948 season of a limited quantity of fresh bilberries, lingberries and similar types, and horseradish from Sweden.

Applications will be considered only from *bona fide* importers of fresh fruit and vegetables and they must be in respect of firm offers of business supported by evidence. They should be submitted in the first instance to the Ministry of Food, Fresh Fruit and Vegetables Division, Import Section, Carlton Hotel, Pall Mall, London, S.W.1.

Copies of the appropriate forms of application (Form ILD/A) may be obtained from the Board of Trade, Import Licensing Department, 189, Regent Street, London, W.1, from the usual Customs Officers or from the Ministry at the above address.

Home-grown Wheat and Barley

The Wheat (Control and Prices) (Great Britain) Order, 1947 (Amendment No. 4) Order, 1948, and the Barley (Control and Prices) (Great Britain) Order, 1947 (Amendment No. 4) Order, 1948, came into force on August 1, 1948, and make the following principal changes:

1. The Orders give effect to the growers' prices for wheat and barley for the 1948-49 season which were announced in June.

2. They increase the fixed charge for M.A.F. sacks from 1s. to 1s. 5d. each and the permitted addition for other non-returnable sacks from 1s. 1d. to 1s. 3d. per cwt. of contents (or from 1s. 4d. to 1s. 6d. per cwt. on a sale of less than 1 cwt.).

3. They give effect to the decision to allow growers to use 20 per cent. of their millable and potentially millable wheat and barley harvested in 1948 for feeding to their livestock.

4. The other conditions on which growers may retain wheat and barley are unchanged except that growers of barley may now be required to obtain the written consent of the County Agricultural Executive Committee (or, in Scotland, of the local office of the Department of Agriculture) before feeding to livestock barley which has been certified by a Local Wheat Committee or by a Ministry Purchasing Officer. The Local Wheat Committees will certify all barley submitted to them according to its millability and not according to its suitability for malting, brewing, distilling, or the manufacture of human food.

5. The restriction on the consignment of barley from England or Wales to Scotland is removed. By a parallel amendment of the Northern Ireland Barley Order, barley may now be consigned from Northern Ireland to other parts of the United Kingdom.

Ceylon Copra Agreement

Agreement has been reached between representatives of the Government of the United Kingdom and the Government of Ceylon for the purchase by the Government of the United Kingdom of copra and coconut oil from Ceylon. This supersedes the existing agreement in respect of the period July 1, 1948, to December 31, 1950.

The new agreement provides that any quantity taken by the United Kingdom during the period July 1, 1948, to December 31, 1948, shall be at the price of £50 per ton of copra, f.o.b. Ceylon ports. The price for a minimum quantity of 40,000 tons as oil in 1949 is based on a price of £55 per ton of copra, f.o.b. Ceylon ports. The price for 1950 is to be agreed towards the end of 1949 in conjunction with negotiations for a long-term contract, possibly for 5 years, to include the year 1950.

Bacon Factory Visits

In order further to promote mutual confidence between pig producers and bacon curers the Ministry of Food has agreed, after consultation with the N.F.U. and the Bacon Marketing Board, to the introduction of arrangements under which selected representatives of producers may visit bacon factories and see the handling and weighing of pigs.

The new arrangements, which will operate shortly, will not involve any interruption of the operations at the factories or any alteration in the present responsibilities of curers and of the Ministry's checkweighers.

Appointment

Mr. F. A. Secrett, C.B.E., V.M.H., has resigned his position as Honorary Adviser to the Ministry of Agriculture and Fisheries on Vegetable Production, with effect from August 1, an appointment he has held since August, 1942.

He will continue his membership of the Agricultural Improvement Council.

Price of Oats

The Oats (Control and Prices) (Great Britain) Order, 1948, which replaces the Oats (Control and Prices) (Great Britain) Order, 1947, came into force on August 1, 1948, and makes the following principal changes:

1. The Order gives effect to the minimum and maximum prices of oats in Great Britain for the 1948-49 season, which were announced in June, and makes fresh provision for storage and handling charges.

2. It increases the fixed charge for M.A.F. sacks from 1s. to 1s. 5d. each and the permitted addition for other non-returnable sacks from 1s. 1d. to 1s. 3d. per cwt. of contents (or from 1s. 4d. to 1s. 6d. per cwt., on a sale of less than 1 cwt.).

3. It prohibits the addition of any charge for cleaning oats.

Rye, Corn, Beans, and Peas

The Rye (Control and Prices) (Great Britain and Northern Ireland) (Amendment No. 2) Order, 1948, the Dredge Corn (Control and Prices) (Great Britain) Order, 1947 (Amendment No. 4) Order, 1948, and the Home-grown Beans and Threshed Feeding Peas (Sack Charges) Order, 1948, came into force on August 1, 1948, and make the following changes in the basic Orders controlling the sale of rye, dredge corn, beans, and threshed feeding peas in Great Britain:

1. They give effect to the new growers' prices for rye and dredge corn for the 1948-49 season which were announced in June.

2. They increase the fixed extra charge for M.A.F. sacks on a sale of rye or dredge corn from 1s. to 1s. 5d. each.

3. They increase the permitted addition for other non-returnable sacks on a sale of rye, dredge corn, beans, or threshed feeding peas from 1s. 1d. to 1s. 3d. per cwt. of contents (or on lots of less than 1 cwt., from 1s. 4d. to 1s. 6d. per cwt. of contents).

Information and Advice

Peel-curing Process

B.2726. *We shall be glad if you will furnish us with details of the Donachie peel-curing process.* (Australia.)

The following is the general scheme of the Donachie peel-curing process:

The pipes of peel are drained of brine and the skins thoroughly rinsed with cold water to leach out the salt, the skins being left in cold water overnight. Cook the following morning and freshen off as usual.

A syrup of sugar and glucose or invert sugar is prepared, sufficient of the latter being incorporated to prevent graining. The syrup is prepared at 60° F., specific gravity 1·123. This is equivalent to 18° Beaumé. The temperature is kept as low as possible to prevent discoloration.

When charging the vacuum pans the charge of skins and syrup must not be greater than that of the charge of liquid sugar and water which can be boiled in the pan to be used. Sufficient syrup is drawn into the pan to float the charge of skins.

The vacuum is started and the temperature gradually raised to 100° F., the volume of syrup drawn in being carefully noted, and the volume in the pan maintained for six hours. During this time the strength of the syrup is raised from 18° Beaumé to 34° Beaumé, that is, specific gravity 1·282. Thus, knowing the original amount of 18° Beaumé syrup drawn in at the commencement, and allowing for the water content of the skins, it is a simple matter to determine the number of gallons of 18° Beaumé syrup to be drawn in and reduced to raise the strength of the syrup to 34° Beaumé. This number divided by 6 will give the rate per hour for continuous processing.

It is essential to ensure that the syrup is drawn in in a continuous flow, so that the increase in syrup strength shall be steady. The temperature at this stage should not be above 115° F.

When the six-hour preparatory stage has been completed, the whole of the 34° Beaumé syrup is drawn off, and a syrup of greater strength substituted for the 18° Beaumé syrup, according to the amount of sugar required in the final peel.

The Ministry of Food minimum sugar content is 64 per cent., and this is met by the process outlined above.

Information Supplied

B.2687. *Manufacturers of magnetic separators.* (Eire.)

B.2690. *Names and addresses of pie manufacturers.* (London.)

B.2691. *Suppliers of acetic acid.* (Lancs.)

B.2693. *Manufacturers of emulsifiers and fat extenders.* (Australia.)

B.2694. *Suppliers of heat-sealing machines for Cellophane.* (Scotland.)

B.2695. *Manufacturers of labelling machinery for biscuit tins.* (Lancs.)

B.2698. *Suppliers of emulsifiers for use in foodstuffs.* (London.)

B.2700. *Names and addresses of suppliers of toffee wrapping paper.* (Eire.)

B.2701. *Manufacturers of vegetable cubing machinery.* (Sussex.)

B.2702. *Suppliers of an automatic machine for air-tight closing of preserving tins.* (London.)

B.2703. *Manufacturers of bone treatment equipment and pressure cookers.* (Devon.)

B.2704. *Suppliers of halibut and cod liver oil.* (Notts.)

B.2723. *Suppliers of whole elder flowers, whole nutmeg, and orris root.* (Mexico.)

B.2725. *Address of the Comité International Permanent de la Conserve.* (London.)

B.2728. *Suppliers of machines for filling approximately 7½ oz. blanched spaghetti into A1 Tall cans at the rate of 50-60 cans per minute.* (Lancs.)

B.2729. *Suppliers of springs and clips for automatic bottles with rubber rings.* (Sussex.)

B.2742. *Literature on the concentration of fruit juices.* (New Zealand.)

B.2743. *Plant for the manufacture of CO_2 gas.* (India.)

B.2744. *Suppliers of sweetening agents.* (London.)

B.2745. *Suppliers of bitumen lacquer used to seal gas-filled tins.* (London.)

B.2747. *Literature in connexion with canned soups.* (Norway.)

B.2748. *Manufacturers of machinery for making doughnuts.* (Lancs.)

B.2752. *Material for dairy floors.* (Yorks.)

B.2755. *Suppliers of a synthetic anion exchange resin.* (Switzerland.)

B.2757. *Suppliers of vinegar bottles.* (Warwicks.)

B.2758. *Suppliers of continuous retorts.* (London.)

B.2759. *Addresses of manufacturers of machines for making paraffinated paper cups.* (Holland.)

B.2760. *Manufacturers of biscuit machinery.* (Mauritius.)

B.2761. *Suppliers of hand-operated fruit sieving machines.* (Lancs.)

B.2765. *Suppliers of apple-peeling machinery and information on the storage of potatoes.* (Lancs.)

B.2768. *Suppliers of glucose.* (Northern Ireland.)

B.2769. *Manufacturers of flexible plastic tubing.* (Northern Ireland.)

B.2771. *Suppliers of vacuum boiling plant.* (Warwicks.)

B.2773. *Baking powder literature.* (Belgium.)

B.2777. *Manufacturers of potato crisps, salad dressing, and garlic sausage.* (Devon.)

B.2779. *Suppliers of machinery for the manufacture and wrapping of small tablets and literature on dried soup powders.* (New Zealand.)

B.2786. *Manufacturers of a small electric stirrer.* (London.)

B.2787. *Names and addresses of manufacturers of synthetic cream.* (Eire.)

Recent Patents

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents," and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Specifications Published

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

603,074. NAAMLOOZE VENNOOTSCHAP W. A. SCHOLTEN'S CHEMISCHE FABRIEKEN: Process of manufacturing nutrient materials in the form of flakes.

603,104. HUDSON, H. H.: Vegetable and fruit slicing machines.

603,266. CAMWHEAT PIE MACHINE CO., LTD., and CAMPBELL, C. R.: Dough moulding and like machines.

603,294. WAGER, H. G., BRIGHTWELL, S. T. P., and ALLEN, R. J. L.: Processing of fruit and vegetables.

603,295. BUTLER, G. I.: Closures for jars, glasses, bowls, tubs, cans or like containers.

605,265. ROBERTSON, M. N.: Apparatus to maintain food in a heated condition after cooking.

Abstract of a Recent Specification

Improvements in Fish Filleting Machines

This invention relates to filleting machines, and more particularly to the means for conveying the fish over the ribbing knives and maintaining the fish in contact with the said ribbing knives.

As described in British Patent 452,688, after a fish, tail leading and back downwards, has been slit through its entire length upwardly through its back to the backbone and the belly side slit by parallel incisions, each fillet remains attached to the backbone of the fish along its lateral sides by a small ribbon of meat. The fillets are further attached to the ribs of the fish. In this condition the fish is propelled with sufficient force on to a pair of ribbing knives. The two ribbons of meat adhering to the backbone are severed by the severing portion of the ribbing knives, so that the fillets remain attached only at the ribs of the fish. The backbone, being freed of the support supplied by the meat, tends to arc downwardly as it passes along the ribbing knives. The ribbing knives engage and scrape along each of the ribs, in spite of their angular variation, to remove the fillets therefrom.

As also shown in British Patent 452,688, there is provided means for conveying and simultaneously holding the fish down on the ribbing knives so that the fillets can be removed from the ribs. This means, herein called a "ribbing conveyor," comprises a pair of endless chains having a series of supporting plates secured thereto in spaced relationship. Each supporting plate is secured at approximately the middle thereof to the chains and journals a lever comprising an arm, which, when carried along the lower lever of the chains, faces downwardly and rearwardly, terminating along its underside in a series of teeth. The other arm extends through the supporting plate so as to project above the chains. The levers are arranged in staggered relationship with each other and are offset laterally so that they can pass on either side of the spikes extending toward the belly of the fish from its backbone.

Objects of this invention are to provide a new and novel ribbing conveyor; to provide a ribbing conveyor utilising one endless chain; to provide a ribbing conveyor having supporting blocks secured to the endless chain in a manner to impart a minimum throw to each block when it passes around the sprockets in travelling from the upper to the lower flights and *vice versa*; to provide a ribbing conveyor in which adjacent blocks, when in a horizontal plane, co-operate with each other to form a substantially rigid structure; and to provide a ribbing conveyor in which each block is provided with two laterally spaced fingers, each of the fingers being movable independently of the other and the block.

589,509. *The Atlantic Coast Fisheries Company.*

Trade Marks

The list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal" and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

BYCO.—651,534. Vinegar, sauces, chutneys, condiments, spices, flavourings (other than essential oils), cereals prepared for food for human use, baking powder, custard powder, blancmange powder, puddings, pudding mixtures, cake mixtures, coffee and coffee extracts. **D. G. Binnington and Company, Limited,** Golf Club House, Cave Road, Brough, Yorkshire; Manufacturers.

MOUNTAIN MAID.—654,906. Canned fruits, canned vegetables, soups, fruit purées and vegetable purées. **Batlow Packing House Co-operative Limited** (a company incorporated under the laws of the Commonwealth of Australia), Batlow, New South Wales, Australia; Manufacturers.

SAMONEET.—658,679. Salmon packed. **Francis Millerd and Company, Limited** (a company incorporated under the laws of Canada), 1698, West Georgia Street, City of Vancouver, Province of British Columbia, Dominion of Canada; Fish Packers.

EGRET.—658,855. Canned fish. **H. G. Kingham and Company, Limited,** The Stores, Station Road, Dorking, Surrey; Merchants.

SUNCAWT.—661,297. Coffee. **Whitehead Bros. (Manchester), Limited,** 19 and 20, Fennel Street, Manchester, Manufacturers.

New Companies

Jeca Trading Company, Limited. (453891.) 7, Ludgate Broadway, London, E.C.4. To carry on business as manufacturers and dealers in foodstuffs and provisions of all kinds, etc. Nom. cap.: £100 in £1 shares. Dirs.: J. Sorensen and S. Sorensen, Villa Carl, Thuro, Denmark.

Eric and Sons (Parkside Creameries), Limited. (454074.) 282, Birstall Street, Leicester. To take over the businesses of ice cream manufacturers carried on by Henrico Frattaroli at 282, Birstall Street, Leicester, and Anthony Altobelli at 11, Knighton Fields Road West, Leicester. Nom. cap.: £6,000 in £1 shares (4,000 "A" and 2,000 "B"). Permt. dirs.: A. Altobelli, 11, Knighton Fields Road West, Leicester; M. Frattaroli, 282, Birstall Street, Leicester.

Carlton Foods Limited. (454818.) 35A, St. John Street, Clerkenwell, E.C. To carry on business of food canners, bottlers, and packers, etc. Nom. cap.: £4,000 in 5s. shares. Dirs.: A. A. Pellat, 78, Hyland Way, Romford, Essex; T. A. Munn, 75, Glenfarg Road, Catford, S.E.6.

Uni-Be Bakers Supplies, Limited. (454921.) 599/600, Bath Road, Trading Estate, Slough. To acquire from British Honey Bottlers, Ltd., the existing lease of a factory at The Trading Estate, Slough, etc. Nom. cap.: £50,000 in £1 shares. Dirs.: E. J. Huxtable, Hyrons Lodge, Woodside Road, Amersham, Bucks; H. F. Snaith, Highfield, 15, Ormonde Rise, Buckhurst Hill, Essex, nominated by the Distillers Co., Ltd.; F. Bowden, 53, Pont Street, Cadogan Square, W. (man. dir.); W. W. H. Beach, Withcombe Park, nr. Gloucester, nominated by British Honey Bottlers, Ltd.

Taken from the Daily Register, compiled by Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C. 2.